# Publications of the Fisheries Research Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland — 1931 to 1984

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## Canadian Manuscript Report of Fisheries and Aquatic Sciences

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Canadian Manuscript Report of
Fisheries and Aquatic Sciences 1790

FEBRUARY 1985

# PUBLICATIONS OF THE FISHERIES RESEARCH BRANCH, NORTHWEST ATLANTIC FISHERIES CENTRE, ST. JOHN'S, NEWFOUNDLAND - 1931 to 1984

by

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## ABSTRACT

Coady, L. W., and J. M. Maldment. 1985. Publications of the Fisheries Research Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland - 1931 to 1984. Can. MS Rep. Fish. Aquat. Sci. 1790: v + 159 p.

The Fisheries Research Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland, has been involved in marine and freshwater fisheries and oceanic research in Newfoundland, Labrador and eastern Arctic waters since 1931. The present report fills a long-standing need for a complete listing of publications by the Branch and includes primary, interpretive scientific and technical references to the end of 1984. Popular and miscellaneous articles of long-term value are also included. Selected analyses of publication performance and research trends are developed in the text.



## RÉSUMÉ

Coady, L. W., and J. M. Maldment. 1985. Publications of the Fisheries Research Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland - 1931 to 1984. Can. MS Rep. Fish. Aquat. Sci. 1790: v + 159 p.

Depuis 1931, la Direction de la recherche sur les pêches de Centre des pêches de l'Atlantique nord-ouest, à St. John's (T.-N.), effectue de la recherche océanique et des études sur les pêches dans les eaux douce et salée de Terre-Neuve, de Labrador et de l'est de l'Arctique. Le présent rapport fournit enfin une liste complète des publications de la Direction; elle comprend des références de journaux scientifiques, de documents interprétatifs et de rapports scientifiques et techniques, publiés jusqu'à la fin de 1984. Sont aussi inclus des articles divers et des textes de vulgarisation, ayant une utilité de longue portée. Des analyses choisies du rendement en matière de publication et des tendances au niveau de la recherche sont élaborées.

## INTRODUCTION

In 1930, Dr. Harold Thompson of the Scottish Fisheries Board visited Newfoundland under the auspices of the Empire Marketing Board to report on fishery research requirements in Britain's oldest colony. On his recommendation, an agreement was reached providing for a 5-year period of fishery research in Newfoundland waters. In 1931, with Thompson as the first Director, a Biological Laboratory was opened at Bay Bulls, 30 km south of St. John's. Initial research efforts centered on the life histories, fluctuations, and movements of the principal fishes of Newfoundland, and the utilization of by-products. From this start, an active fisheries research program has continued to the present day.

Selected milestones which have had a bearing on research direction since 1930 are presented in Table 1 and include organizational changes, vessel deployments, extended jurisdiction and the expansion of national and international scientific responsibilities. Throughout its history, the organization has been involved in the acquisition and interpretation of biological and other knowledge essential to the management of marine and freshwater resource species and their habitat. Research capabilities have expanded northward and offshore in concert with a growing multinational fishery and present-day activities extend geographically from the Gulf of St. Lawrence and Grand Banks to the Labrador Sea and Hudson-Davis Strait (Fig. 1) involving temperate, sub-Arctic and Arctic investigations in fisheries science.

A fundamental measure of scientific achievement since 1931 is found in the organization's publication record. The present report examines the immense store of new knowledge developed by Branch researchers in the past 54 years and identifies scientific information available from the Northwest Atlantic Fisheries Centre. For the first time, a complete listing of Branch publications is available under one cover. Various analyses of publication trends and productivity are offered which reflect staff, mandate and other changes throughout the years. The index will be incorporated in the national publication documentation and indexing system maintained by the Scientific Information and Publications Branch (SIPB), Department of Fisheries and Oceans (DFO), Ottawa. Publication updates, beyond 1984, will appear in annual review documents prepared by the Branch.

## METHODS

### PUBLICATIONS

Publication lists were developed from annual reports, library records, publication indexes (SIPB, ICNAF/NAFO, CAFSAC, ICES, etc.), questionnaires to staff, and individual interviews. Careful attention was given to the proper use of abbreviations and paginations were checked to ensure accuracy. Serial Sources for the BIOSIS Data Base served as a standard reference. General questions on formatting were referred to SIPB to ensure consistency with national indexing procedures.

Publications listed in this report were prepared by researchers while employed by the Fisheries Research Branch, Newfoundland Region. Any papers prepared by staff prior to taking up positions with the Branch, or after leaving, are excluded regardless of topic, data sources, or mailing addresses appearing in the article. Scientific publications authored by non-DFO staff based on work funded by the Branch are included. The latter citations are identified by means of an asterisk.

Research documents prepared for stock assessment purposes may appear as CAFSAC (Canadian Atlantic Fisheries Scientific Advisory Committee) reports and reappear, without modification or with minor changes, in ICES (International Council for the Exploration of the Sea), NAFO (Northwest Atlantic Fisheries Organization), or other series. In such cases, the most recent reference is cited with other forms of the same paper noted in brackets. In cases where a research document, or comparable material, was reworked and upgraded to primary status under the same title, the two references are kept separate. Where possible, notes on follow-up primaries are provided in the text.

Publications of the Fisheries Research Branch from 1931 to 1984 appear in Appendix 1. Administrative responsibilities for technological investigations in fisheries in Newfoundland waters were transferred to Halifax in 1949. Technological personnel continued studies in Newfoundland waters and worked in close administrative liaison with the Newfoundland Biological Station but did not formally rejoin the organization until 1971. W. A. MacCallum transferred to St. John's to take charge of the expanded Newfoundland Technological Unit in 1960. Publications of the Unit (now Microbial Chemistry Section) from 1960 to 1970 (i.e. prior to joining the Branch) appear in Appendix 2.

Table 1. Selected milestones, 1931-84.

| | |
|---|---|
| 1930-36 | Dr. H. Thompson, Director. |
| 1931 | Establishment of Biological Laboratory, Newfoundland Fishery Research Commission at Bay Bulls, Newfoundland. |
| 1934 | Fisheries Research Commission dissolved by new Commission of Government; organization renamed Fisheries Research Laboratory, Division of Fishery Research; Newfoundland Department of Natural Resources. |
| 1936 | Research staff relocated from Bay Bulls to Court House, St. John's as part of Government Analyst's Laboratory. |
| 1937-43 | Dr. W. F. Hampton, Acting Director. |
| 1937 | Bay Bulls Laboratory destroyed by fire on April 19, 1937. |
| 1940 | New laboratory opened at the east end of Water St., St. John's. |
| 1944-72 | Dr. W. Templeman, Director. |
| 1946-70 | 25 m (82 ft) INVESTIGATOR II employed as first permanent research vessel. |
| 1946-70 | 15 m (50 ft) PARR employed as permanent research vessel (named GRILSE prior to 1950). |
| 1949 | Formation of International Commission for the Northwest Atlantic Fisheries (ICNAF). |
| 1949 | Organization renamed Newfoundland Biological Station, Fisheries Research Board of Canada upon Newfoundland's confederation with Canada. |
| 1953-74 | 20 m (65 ft) MARINUS employed as permanent research vessel. |
| 1958-83 | 54 m (177 ft) A. T. CAMERON employed as permanent research vessel. |
| 1964 | Canada adjusted its traditional three-mile limit to encompass twelve miles. |
| 1968 | Canada became member of the International Council for the Exploration of the Sea (ICES). |
| 1971 | Newfoundland Technological Unit (now Microbial Chemistry Section) joined Newfoundland Biological Station. |
| 1972-75 | Dr. A. W. May, Director. |
| 1972 | Administrative and programming responsibilities for the Newfoundland Biological Station transferred from the FRBC to the Research and Development Directorate of the Fisheries and Marine Service, Department of Environment. |
| 1973-74 | Introduction of groundfish TACs (total allowable catches) by ICNAF. |
| 1975-present | 23 m (75 ft) SHAMOOK employed as permanent research vessel. |
| 1975-78 | A. M. Fleming, Director. |
| 1975 | Organization renamed Research and Resource Services. |
| 1975 | Resource Development Branch (now largely Freshwater and Anadromous Fish Program) joined Research and Resource Services. |
| 1977 | Canada declared 200 mile zone of Extended Fisheries Jurisdiction. |
| 1977 | Formation of Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC). |
| 1977-present | 80 m (264 ft) GADUS ATLANTICA employed as long-term charter for offshore fisheries research. |
| 1978-present | 21 m (70 ft) MARINUS employed as replacement for first MARINUS. |
| 1978-81 | E. J. Sandeman, Director. |
| 1979 | ICNAF replaced by Northwest Atlantic Fisheries Organization (NAFO). |
| 1979 | Research and Resource Services transferred from Department of Environment to new Department of Fisheries and Oceans. |
| 1978 | Opening of Northwest Atlantic Fisheries Centre (NAFC), White Hills, St. John's. |
| 1981-present | M. C. Mercer, Director. |
| 1981 | Formation of Gulf Region; research responsibilities in the Gulf of St. Lawrence dropped. |
| 1982 | Research and Resource Services renamed Fisheries Research Branch. |
| 1982 | 50 m (165 ft) WILFRED TEMPLEMAN employed as permanent research vessel replacing A. T. CAMERON. |

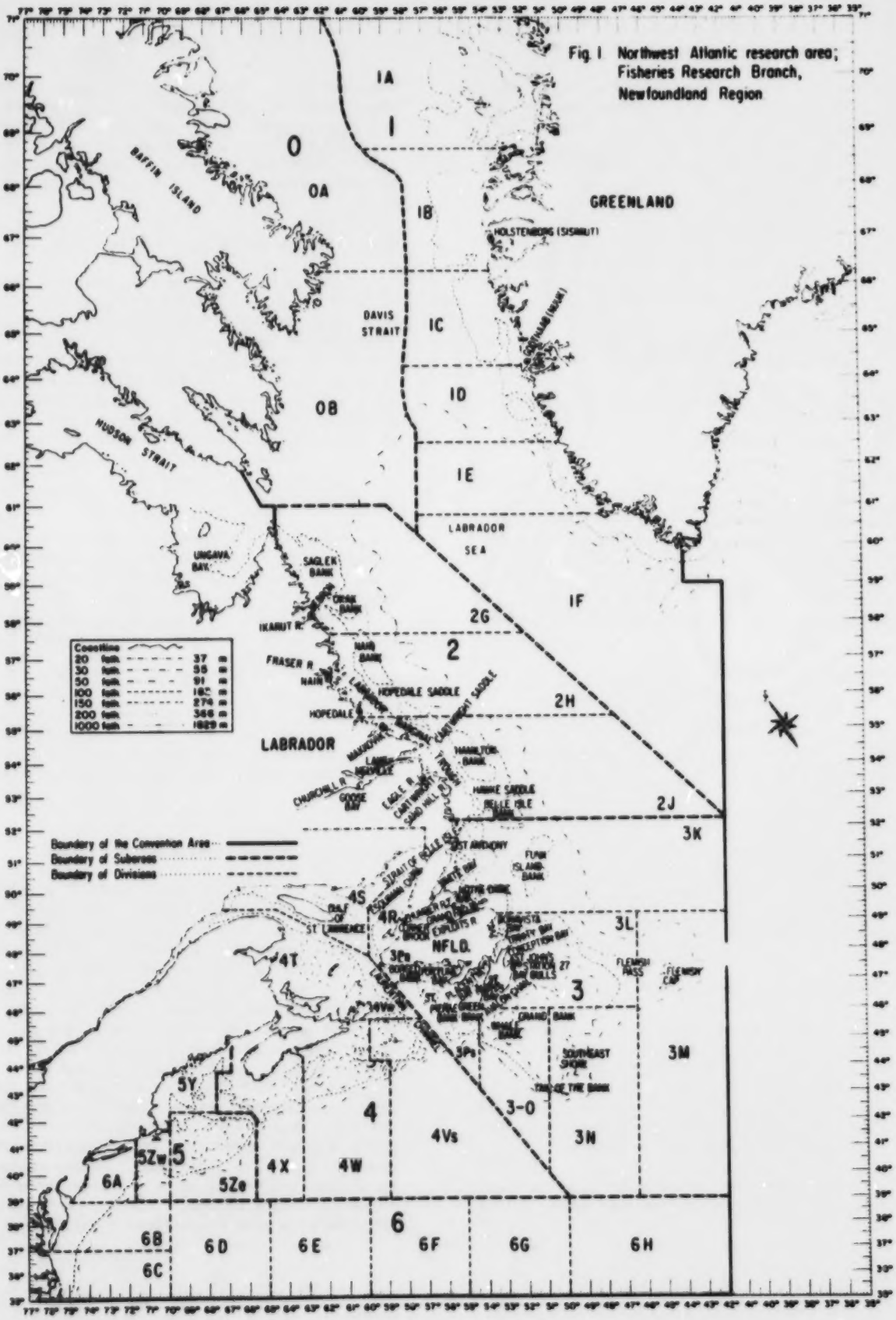
Fig. 1 Northwest Atlantic research area; Fisheries Research Branch, Newfoundland Region
IA
0
1
OA
IB
GREENLAND
BAFFIN ISLAND
HOLSTENBORG (SISIMIUT)
DAVIS STRAIT
IC
ID
0B
HUDSON STRAIT
IE
LABRADOR SEA
IF
UNGAVA BAY
SAGLEK BANK
OKAK BANK
IKARUT R.
2G
2
HAIR BANK
FRASER R.
NAIN
HOPEDALE SALDDLE
2H
HOPEDALE
LABRADOR
HAMILTON BANK
HARRE SALDDLE
BELLE ISLE
2J
3K
Coastline
20 fath 37 m
30 fath 55 m
50 fath 91 m
100 fath 183 m
150 fath 274 m
200 fath 366 m
1000 fath 1829 m
Boundary of the Convention Area
Boundary of Subareas
Boundary of Divisions
ST ANTHONY
FLAW ISLAND BANK
4S
4R
3L
NFLD.
4T
3Pn
3
FLEMISH PASS
FLEMISH CAP
3Ps
GRAND BANK
SOUTHEAST SHOAL
3M
5Y
4
3-0
4Vs
3N
5Zw
5
4X
4W
6A
5Ze
6
6B
6D
6E
6F
6G
6H
6C

A second group, the Resource Development Branch (now the greater part of the Freshwater and Anadromous Fish Program) was annexed in late 1975. Originally known as the Fish Culture Branch, the group was formed in 1954 with responsibilities for anadromous and resident freshwater species. Activities included life history studies of salmon and trout, relocations of salmon runs in areas affected by hydro development, installations of fishways, stream surveys and resource inventories, pollution studies (now fish habitat activities in Experimental Ecology Program (FRB) and several functions transferred to the Environmental Protection Service, Environment Canada) and the development of salmon enhancement strategies for application throughout the Province. Publications prior to 1976 (i.e. 1954-75) may be referenced in Appendix 3.

CATEGORIZATION

Revised definitions for publication and document categories were introduced by the Scientific Information and Publications Branch in July 1983, following extensive regional/national consultation occassioned in large measure by the preparation of the present publication. Four categories are now in use:

1. Primary publications

Primary publications are those reporting original findings and data for the first time in formally refereed and edited publications that are usually part of a regular journal series receiving general or unlimited distribution and that are usually abstracted and indexed routinely. Original research papers presented at symposia and that are published in their entirety, after formal refereeing and editing, in special proceedings of the symposium, are included in this category.

2. Interpretive scientific publications

Interpretative scientific publications review a particular subject area or develop a comprehensive picture synthesized from a broad range of findings, part of which may be reported by the author for the first time and part of which may be synthesized from previously published work of others.

This category includes critical reviews, chapters in books or entire books, CJFAS Perspectives, DFO Bulletins and other monographic works, DFO Special Publications, etc., which are usually refereed and edited and which receive general or unlimited distribution and are usually abstracted and indexed routinely.

3. Scientific and technical reports

This category covers scientific and technical material intended for distribution of a more limited nature than for primary or interpretive categories. It would contain information which would not be acceptable as research journal or interpretive scientific publications and may be targetted to scientists, industry, policy makers and other special interest groups. Material is not usually refereed externally and is generally produced locally at individual institutions in limited numbers.

Examples of material included are Technical Reports, Data Reports, Industry Reports, Manuscript Reports, Contract Reports, ICES Reports, CAFSAC Research Documents (CAFSAC and other Working Papers bear no status as scientific documents and are not publications), NAFO Sci. Council Studies, INPFC Documents, and Technical Circulars to DFO clients. Conference proceedings (excluding abstracts), workshop reports, post graduate theses supported by DFO, and similar publications that are not refereed externally are also included in this category.

4. Popular and miscellaneous publications

This category covers material written for distribution to audiences that generally differ from those for the primary, interpretive and scientific technical categories. Popular articles are targetted to DFO clients needing an understanding of DFO projects and science in general. They are written in such a way that a generally non-scientific audience can readily grasp the message without having to wade through a maze of technical details. The content should have some long-term value. Largely ephemeral articles that have little relationship to DFO's and R&D objectives or accomplishments are excluded. Included would be Underwater World and relevant magazine articles, such as those in Nature Canada, Pacific Diver, etc. Articles of a more miscellaneous nature would

be book reviews, letters to scientific journals, editorials, obituaries, abstracts of papers presented at scientific meetings (where proceedings are widely circulated), etc. Also included would be various documents internal to the organization, such as policy documents, reports from contracts not suitable for distribution as formal Contract Reports, observer manuals, enhancement plans, etc., that need to be documented according to Access to Information legislation.

For purposes of analysis, a numeric (for period 1931-72) or alphanumeric (for period 1973-84) code was assigned to each publication in Appendix 1 on the following basis:

1 Primary publication
2 Interpretive scientific publication
3 Scientific and technical report
4 Popular and miscellaneous publication

G Groundfish Program
P Pelagic Fish, Shellfish, Marine Mammals Program
F Freshwater and Anadromous Fish Program
E Experimental Ecology Program
O Other (includes Director's Office and contracted reports by non-DFO authors; the latter are preceded with an asterisk)

There were minor problems in categorizing some publications that accept a variety of articles - some obviously the first reporting of research results, others clearly synthesis material and still others of a popular nature. Checks were made to ensure that the proper designations were applied. Proceedings of symposia reflect a wide range and quality of material and proved a bit problematic. Papers presented at symposia are not publications unless included in symposia proceedings that receive wide distribution. Proceedings material receiving only limited distribution among conference participants or member mailing lists was not included. In general, the revised categories proved easy to apply and pose meaningful standards for purposes of analysis.

Although organizational units within FRB have changed over the past decade, little difficulty was experienced in assigning publications to the appropriate Programs for the period 1973-84. In cases where researchers moved internally from one Program to another, checks were made to determine in which Program the write-up was prepared. The reader will therefore note papers on such things as shrimp which have been assigned to the Groundfish Program.

## SCIENTIFIC STAFF

A list of scientific staff employed by the Fisheries Research Branch from 1931 to 1984 is provided in Appendix 4. Arrival and departure dates were extracted from annual reports, personnel records and other sources, and used to develop person-year utilization (cf. allocation) figures for various analyses.

The following classification groups (continuing full-time and term) were defined as scientific staff:

RES - research scientist
EX - executive
BI - biologist
SM - senior management
CH - chemist
REM - research management
CS - computer scientist
PM - program administration

Post Doctorate (Visiting) Fellows (equivalent person years) were also included. Extended periods of secondment and leave without pay (i.e. >6 months) were taken into account; educational leave was not. A number of individuals attached organizationally to the Branch between 1936 and 1949 (as part of the Government Analyst's Laboratory) were not specifically involved in fisheries research and have been omitted. Staff of the Newfoundland Technological Unit are not referenced prior to joining the Branch on April 1, 1971. Research personnel of the Resource Development Branch are not included prior to January 1, 1976 (the group amalgamated with FRB in late 1975).

## ORGANIZATION

The organization of research programs and activities from 1949 to 1984 is depicted in Appendix 5 and, in conjunction with milestones listed in Table 1, provides an excellent basis for the interpretation of research priorities and direction over that period.

## ANALYSES

All Fisheries Research Branch publications from 1931 to 1984 (Appendix 1) are categorized and grouped in Table 2 to illustrate general trends. Listings appearing in Appendix 2 (Technological Unit) and Appendix 3 (Resource Development Branch) are not included.

In Table 3, publications from 1950 onward are analyzed on the basis of the departmental Program Activity Structure, which identifies research outputs on an activity basis. Activities are strictly defined at the national level to ensure uniform application. Publications fitting more than one activity or difficult to assign were omitted from the analysis. Figures presented are percentages.

General trends within Programs, from 1973 to 1984, are displayed in Table 4. Program titles are those in present use. Table 4 totals do not correspond to actual publication levels in Table 2 due to the incidence of multiple authorship and the omission of non-DFO and other-DFO (i.e. non-Program) material. In cases of multiple authorship where all authors belong to the same Program, a single credit is assigned. Where authors belong to different Programs, each group is credited. Resource Development Branch publications prior to 1976 (when they joined the Branch) are not included in the Freshwater and Anadromous Fish Program totals.

Professional person-year utilization figures, 1950-84, were developed from scientific staff listings appearing in Appendix 4 and used to illustrate publication performance levels for different categories of publications (Table 5). Publications prepared by non-DFO authors (i.e. contracted reports) are not included in the analysis.

Virtually 80% of present-day research activities in the Newfoundland Region are geared to the provision of resource assessment advice to national and international fisheries managers. The International Commission for the Northwest Atlantic Fisheries (ICNAF) and its successor, the Northwest Atlantic Fisheries Organization (NAFO), have been particularly reliant on scientific advice on stock status, as has the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) since its formation in 1977. The level of publication output (1949-84) vetted through these groups is examined in Table 6. Figures are again expressed as percentages.

## RESULTS AND DISCUSSION

### OVERVIEW AND ANALYSIS

The original research program developed by Harold Thompson in 1931 concentrated on the provision of advice to fishermen as to the movements of the major commercial species. With the part-time use of the trawler CAPE AGULHAS, surveys were carried out from 1931 to 1935 which included plankton studies, dredges and trawls and the collection of hydrographic data over inshore and offshore areas.

When Thompson departed in 1936, a number of key researchers left with him. William Hampton served as Acting Director from 1937 to 1943, a period plagued with staffing and other problems, such as the fire of 1937 which destroyed the Bay Bulls Laboratory and valuable scientific records and equipment. During the war years, research was restricted to biological studies on lobster, capelin, salmon, herring, dogfish, trout and plankton in the Newfoundland inshore area and some work on fish products.

Dr. Wilfred Templeman took over in 1944 and directed research activities in Newfoundland and Labrador waters for almost 30 years, retiring in 1972. Within that period, numerous advances were made administratively and logistically (Table 1; Appendix 5) to deal with increasing demands for scientific advice.

Groundfish research resumed in 1946 when the INVESTIGATOR II was launched. Research efforts were expanded on the major commercial species and new unexploited grounds were explored between 1946 and 1959. The laboratory joined the Fisheries Research Board of Canada in 1949 and played a significant role in the formation of ICNAF the same year. With the union of Newfoundland and Canada in 1949, the Newfoundland Laboratory relinquished responsibilities for technological and product development to the Atlantic Experimental Laboratory in Halifax and concentrated on biological and hydrological research needs. Various analytical and inspection functions were dropped as well and assumed by Fish Inspection.

Following the exploratory phase, research emphasis shifted to aspects of fish in relation to their environment and an understanding of stock relationships. With increased exploitation and overexploitation by an international fishery during the 1960s, research in population dynamics (age, growth, recruitment) was intensified to better understand how natural factors and exploitation by man were affecting stock size and abundance in order to more effectively manage the fishery. The 54 m A. T. CAMERON was launched in 1958, expanding offshore and northern research capabilities.

With Dr. Templeman's retirement in 1972, Dr. Arthur May served as Director for three years; followed by Allister Fleming commencing in 1975, for another three. Within that period, Canada extended its fisheries jurisdiction to 200 miles (January 1, 1977) and allotted greater resources to fishery research to meet increased demands for management advice. E. J. (Sandy) Sandeman became Director in 1978 and was succeeded by M. C. (Mac) Mercer in 1981.

The formation of CAFSAC in 1977 and the replacement of ICNAF with NAFO in 1979 placed added scientific responsibilities on Newfoundland researchers and, by 1980, fully 80% of Branch resources were devoted to resource assessment and related research. Remaining studies centered on resource development and habitat research and assessment.

Since 1980, increasing attention has been given to ecosystems strategies in managing fish resources. Progress to date has been decidedly slow for even the simplest species interactions so that process-oriented research can be expected to accelerate, especially that aimed at an understanding of recruitment processes and energy transfer recognizing that variability, not stability (in fish abundance and year-class strength), is the essence of biological systems. Aspects of ocean climate will be increasingly important in the refinement of biological and oceanographic models. In keeping with the trend toward ecosystems management beyond 1984 will be an emphasis on interdisciplinary research reliant on team work and co-ordination among specializations. Efforts will be accelerated to improve the precision of estimates of total allowable catch, catch rates, stock forecasts and other outputs from stock assessment.

In its 54-year history, the Fisheries Research Branch has produced 2,100 primary, interpretive scientific, technical, popular and miscellaneous articles (Appendix 1) of which 40% were produced since 1980. An additional 200+ items credited to the Newfoundland Technological Unit and the Resource Development Branch (prior to joining the organization) appear in Appendices 2 and 3 respectively.

The reader is referred to Tables 2-6 for a retrospective examination of publication performance by Branch researchers since 1931. The following points are noted:

- There have been 147 researchers employed by the Fisheries Research Branch since its inception on April 1, 1931 (Appendix 4). General increases in staff occurred following:

  a) Newfoundland's confederation with Canada when fisheries researchers in the Newfoundland Government Laboratory joined the Fisheries Research Board of Canada;

  b) the introduction of quota management by ICNAF in the early 1970s; and

  c) the declaration of a 200-mile fisheries zone by Canada in 1977.

  Staff declines were experienced:

  a) in 1936-37 with the termination of the initial five year Fisheries Research Scheme and H. Thompson's resignation (several key researchers left with him);

  b) during the war years;

  c) in the mid-1950s (difficulties were experienced in replacing a number of scientists recruited earlier from Britain); and

  d) since 1980, with the transfer of mandate and person years to the new Gulf Region; increasing numbers of Post Doctorate Fellows have been sponsored in recent years to maintain professional staff levels.

- From 1950 to 1984, the Branch has averaged 2.1 publications per professional per annum of which 0.6 appeared in the primary or interpretive scientific literature (Table 5). Primary publication performance has been stable since 1960. There has been a minor increase in scientific and technical reports over the same period. In essence, the growing responsiveness to management needs and increased demands for assessment advice since 1960 do not appear to have had a detrimental effect on the level of primary publication.

- Overall Branch publication in the Canadian Journal of Fisheries and Aquatic Sciences has declined from 0.5 contributions per professional per year in the 1960s to 0.3 in the 1970s and 0.1 since 1980 (figures derived

from information in Tables 2 and 5). Corresponding interest in all other journals has risen from 0.2 contributions per professional per year in the 1960s to 0.3 and 0.5 in the 1970s and 1980s respectively. Approximately 85 journals other than CJFAS have been used since 1950 yet CJFAS remains one of the most frequently used primary publication avenues. The most popular journals (top ten in order of preference) are as follows:

1) Can. J. Fish. Aquat. Sci. (formerly JFRB; JFRBC)
2) J. Northw. Atl. Fish. Sci. (formerly ICNAF Res. Bull.)
3) Can. J. Zool.
4) Rapp. P.-V. Reun. Cons. Int. Explor. Mer
5) Nat. Can. (Que.)
6) Carbohydr. Res.
7) Can. Field-Nat.
8) Bull. Environ. Contam. Toxicol.
9) Trans. Am. Fish. Soc.
10) Comp. Biochem. Physiol.

- From 1960 to 1984, primary papers represent, on average, 25% of the Branch's total annual publication output; interpretive scientific 3%; scientific and technical reports 56%; and popular and miscellaneous 16% (Table 2). Scientific and technical reports have increased from an average of 45% in the 1960s to 62% in the 1970s and 64% in the 1980s. Popular and miscellaneous material declined after 1973 with the discontinuation of the St. John's Biological Station Circulars. Renewed attention has been given to high-quality factsheets in the past several years.

- From 1952 to 1976, ICNAF/NAFO documents (primary and scientific/technical) represent an average of 38% of total annual Branch publications (Table 6). With the extension of Canadian jurisdiction to 200 miles and formation of CAFSAC in 1977, the level fell to 31%, on average, between 1977 and 1984. Since 1977, ICNAF/NAFO and CAFSAC documents combined represent an even 50% (average per year) of Branch output, reflecting increasing demands for assessment advice. The NAFO situation is unique to the Newfoundland Region as no other Atlantic DFO Region is involved to the same extent. The level of CAFSAC contributions has been stable since 1977 and averages 19% of Branch publication output per annum.

- Although NAFO and CAFSAC analyses are very time consuming, they normally result in short documents, several tables and figures of a biological, semi-mathematical type. In many cases, these do not lend themselves to direct upgrading to primary papers and a lot of excellent material remains in the "grey" literature.

- The Departmental Report Series, which includes Technical, Manuscript, Data and Industry Reports, was inaugurated in 1968. Initial interest was high and in the first three years, the Branch contributed, on average, 0.5 reports per professional to the series. In 1971, the level dropped to 0.2 per professional per year and has fluctuated between 0.1 and 0.2 ever since. Of the 123 documents appearing in the Report Series since 1968, 85 (69%) have been Technical Reports, 27 (22%) Data Reports, 9 (7%) Manuscript Reports, and 2 (2%) Industry Reports.

- Publication levels within Programs (1973-84) are depicted in Table 4. It is apparent that Groundfish and Pelagic Fish-Shellfish-Marine Mammals researchers produce more scientific and technical material (primarily research advisory documents) than the remaining groups. Fewer advisory and assessment responsibilities fall to the Experimental Ecology Program and primary publication levels are correspondingly higher in that group. The sudden jump in scientific and technical reports in GF and PSMM after 1977 was due to the formation of CAFSAC. Within the Freshwater and Anadromous Fish Program, primary and scientific/technical publication levels are increasing (e.g. primary publication output tripled between 1984 and 1985).

- Significant improvements in publication performance were evident in 1984. Overall publication levels were 27% higher than in 1983 and primary/scientific interpretive output more than doubled.

## PUBLICATION TRENDS

Publication trends are examined in detail in the ensuing paragraphs. The Department's Program Activity Structure (Table 3) was chosen as a basis for analysis. Principal investigators are identified throughout as a guide to readers interested in a particular subject area.

Table 2. Fisheries Research Branch (Newfoundland) publications, 1931-84, by category and selected groupings.

| Year | Primary | | | | Interpretive Scientific | Scientific and Technical | | | | | | Popular and Misc. | | Total actual publs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | JFRB/ CJFAS | ICNAF/ NAFO | Other | Total (%) | Total (%) | ICNAF/ NAFO | ICES | CAFSAC | Dept. report series | Other | Total (%) | Total (%) | | |
| 1931 | - | - | - | - - | - - | - | - | - | - | - | - - | 1 (100) | | 1 |
| 1932 | - | - | - | - - | - - | - | - | - | - | 4 | 4 (80) | 1 (20) | | 5 |
| 1933 | - | - | 1 | 1 (33) | - - | - | - | - | - | 1 | 1 (33) | 1 (33) | | 3 |
| 1934 | - | - | - | - - | - - | - | - | - | - | 3 | 3 (75) | 1 (25) | | 4 |
| 1935 | - | - | - | - - | - - | - | - | - | - | 3 | 3 (75) | 1 (25) | | 4 |
| 1936 | - | - | - | - - | - - | - | - | - | - | 3 | 3 (75) | 1 (25) | | 4 |
| 1937 | - | - | - | - - | - - | - | - | - | - | 1 | 1 (33) | 2 (67) | | 3 |
| 1938 | - | - | - | - - | - - | - | - | - | - | 8 | 8 (100) | - - | | 8 |
| 1939 | - | - | - | - - | - - | - | - | - | - | 4 | 4 (100) | - - | | 4 |
| 1940 | - | - | - | - - | - - | - | - | - | - | 6 | 6 (100) | - - | | 6 |
| 1941 | - | - | - | - - | - - | - | - | - | - | 1 | 1 (100) | - - | | 1 |
| 1942 | 1 | - | - | - - | - - | - | - | - | - | - | - - | - - | | 1 |
| 1943 | - | - | - | - - | - - | - | - | - | - | 3 | 3 (100) | - - | | 3 |
| 1944 | 2 | - | - | 2 (67) | - - | - | - | - | - | 1 | 1 (33) | - - | | 3 |
| 1945 | - | - | 1 | 1 (20) | - - | - | - | - | - | 1 | 1 (20) | 3 (60) | | 5 |
| 1946 | - | - | - | - - | - - | - | - | - | - | - | - - | 1 (100) | | 1 |
| 1947 | - | - | 1 | 1 (50) | - - | - | - | - | - | - | - - | 1 (50) | | 2 |
| 1948 | - | - | - | - - | - - | - | - | - | - | 5 | 5 (100) | - - | | 5 |
| 1949 | - | - | - | - - | - - | - | - | - | - | - | - - | 1 (100) | | 1 |
| 1950 | - | - | - | - - | - - | - | - | - | - | - | - - | 1 (100) | | 1 |
| 1951 | - | - | - | - - | - - | - | - | - | - | 5 | 5 (71) | 2 (29) | | 7 |
| 1952 | - | - | - | - - | - - | 5 | - | - | - | 3 | 8 (89) | 1 (11) | | 9 |
| 1953 | - | - | - | - - | - - | 5 | - | - | - | 1 | 6 (67) | 3 (33) | | 9 |
| 1954 | 2 | - | 2 | 4 (29) | - - | 2 | - | - | - | 2 | 4 (29) | 6 (42) | | 14 |
| 1955 | 2 | - | - | 2 (17) | - - | 2 | - | - | - | 1 | 3 (25) | 7 (58) | | 12 |
| 1956 | 4 | - | 1 | 5 (33) | 2 (13) | 2 | - | - | - | 2 | 4 (27) | 4 (27) | | 15 |
| 1957 | 4 | - | 2 | 6 (40) | - - | 2 | - | - | - | - | 2 (13) | 7 (47) | | 15 |
| 1958 | 5 | - | 2 | 7 (28) | - - | 4 | - | - | - | 1 | 5 (20) | 13 (52) | | 25 |

. . . cont'd.

Table 2 (Cont'd.)

| Year | Primary | | | | Interpretive Scientific | | Scientific and Technical | | | | | | Popular and Misc. | | Total actual publs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | JFRB/ CJFAS | ICNAF/ NAFO | Other | Total (%) | Total (%) | | ICNAF/ NAFO | ICES | CAFSAC | Dept. report series | Other | Total (%) | Total (%) | | |
| 1959 | 2 | - | - | 2 (17) | 1 | (8) | 6 | - | - | - | - | 6 (50) | 3 | (25) | 12 |
| 1960 | 3 | - | - | 3 (38) | - | - | 3 | - | - | - | - | 3 (37) | 2 | (25) | 8 |
| 1961 | 1 | - | - | 1 (5) | 1 | (5) | 9 | - | - | - | 2 | 11 (55) | 7 | (35) | 20 |
| 1962 | 4 | - | 1 | 5 (25) | 1 | (5) | 10 | - | - | - | 1 | 11 (55) | 3 | (15) | 20 |
| 1963 | 8 | - | 1 | 9 (29) | 3 | (10) | 14 | - | - | - | - | 14 (45) | 5 | (16) | 31 |
| 1964 | 5 | 1 | 1 | 7 (29) | - | - | 9 | - | - | - | 3 | 12 (50) | 5 | (21) | 24 |
| 1965 | 10 | 4 | - | 14 (29) | - | - | 18 | - | - | - | 5 | 23 (47) | 12 | (24) | 49 |
| 1966 | 7 | 1 | 2 | 10 (18) | 2 | (4) | 11 | 2 | - | - | 6 | 19 (34) | 25 | (44) | 56 |
| 1967 | 11 | 4 | 2 | 17 (34) | - | - | 16 | - | - | - | 1 | 17 (34) | 16 | (32) | 50 |
| 1968 | 8 | 3 | 2 | 13 (23) | - | - | 13 | - | - | 12 | 5 | 30 (53) | 14 | (24) | 57 |
| 1969 | 8 | 4 | 6 | 18 (28) | - | - | 12 | - | - | 6 | 10 | 28 (44) | 18 | (28) | 64 |
| 1970 | 15 | 1 | 4 | 20 (36) | - | - | 18 | 1 | - | 7 | 2 | 28 (51) | 7 | (13) | 55 |
| 1971 | 6 | 5 | 2 | 13 (26) | 1 | (2) | 25 | - | - | 3 | 2 | 30 (60) | 6 | (12) | 50 |
| 1972 | 3 | 4 | 2 | 9 (19) | - | - | 25 | 1 | - | 4 | 8 | 38 (79) | 1 | (2) | 48 |
| 1973 | 10 | 5 | 4 | 19 (31) | 1 | (2) | 30 | 1 | - | 3 | - | 34 (56) | 7 | (11) | 61 |
| 1974 | 5 | - | 5 | 10 (16) | 1 | (2) | 33 | 3 | - | 3 | 8 | 47 (75) | 5 | (7) | 63 |
| 1975 | 14 | 7 | 3 | 24 (44) | - | - | 14 | 8 | - | 1 | 4 | 27 (50) | 3 | (6) | 54 |
| 1976 | 9 | 4 | 8 | 21 (28) | 13 | (17) | 17 | 7 | - | 8 | 7 | 39 (52) | 2 | (3) | 75 |
| 1977 | 5 | - | 9 | 14 (23) | 1 | (2) | 19 | 2 | 10 | 4 | 4 | 39 (65) | 6 | (10) | 60 |
| 1978 | 12 | 5 | 12 | 29 (31) | - | - | 24 | 4 | 19 | 8 | 3 | 58 (62) | 7 | (7) | 94 |
| 1979 | - | 4 | 10 | 14 (12) | 3 | (3) | 41 | 10 | 24 | 8 | 10 | 93 (80) | 6 | (5) | 116 |
| 1980 | 12 | 3 | 22 | 37 (22) | 7 | (4) | 47 | 11 | 29 | 11 | 16 | 114 (69) | 8 | (5) | 166 |
| 1981 | 7 | 6 | 19 | 32 (20) | 4 | (3) | 50 | 11 | 31 | 14 | 7 | 113 (71) | 10 | (6) | 159 |
| 1982 | 6 | 8 | 20 | 34 (21) | 6 | (4) | 45 | 8 | 26 | 9 | 16 | 104 (64) | 18 | (11) | 162 |
| 1983 | 7 | - | 17 | 24 (15) | 8 | (5) | 40 | 8 | 32 | 8 | 12 | 100 (61) | 32 | (19) | 164 |
| 1984 | 10 | 19 | 28 | 57 (27) | 7 | (3) | 45 | 10 | 32 | 14 | 17 | 118 (57) | 27 | (13) | 209 |

Table 3. Publication trends, 1950–84, based on departmental Program Activity Structure (PAS), expressed as percentages (see text).

| | 1.4.1 Resource Assessment and Related Research | | | | | | | 1.4.2 Aquaculture and Resource Development Research | | 1.4.3 Habitat Assessment and Related Research | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1.4.1.1 Anadromous, Catadromous, Freshwater Fish | 1.4.1.2 Groundfish | 1.4.1.3 Invertebrates | 1.4.1.4 Marine Mammals | 1.4.1.5 Marine Plants | 1.4.1.6 Pelagic Fish | 1.4.1.7 Fisheries Ecology | 1.4.2.1 Aquaculture | 1.4.2.2 Resource Development, Enhancement | 1.4.3.1 Aquatic Impact Assessment | 1.4.3.2 Toxicology and Pollution |
| 1950 | | | | | | | | | | | |
| 1951 | | 83 | | 17 | | | | | | | |
| 1952 | | 100 | | | | | | | | | |
| 1953 | | 40 | | 40 | | | 20 | | | | |
| 1954 | | 57 | 14 | 29 | | | | | | | |
| 1955 | 14 | 72 | | | | | | | | | 14 |
| 1956 | 25 | 59 | | | | 8 | 8 | | | | |
| 1957 | 18 | 46 | 9 | 9 | | | 18 | | | | |
| 1958 | 20 | 55 | 15 | | | 10 | | | | | |
| 1959 | | 78 | 11 | | | 11 | | | | | |
| 1960 | | 100 | | | | | | | | | |
| 1961 | | 69 | 8 | 15 | | 8 | | | | | |
| 1962 | | 70 | 10 | | | 10 | 10 | | | | |
| 1963 | 13 | 73 | 7 | 7 | | | | | | | |
| 1964 | 7 | 79 | 14 | | | | | | | | |
| 1965 | 8 | 49 | 11 | | | 3 | 29 | | | | |
| 1966 | 16 | 57 | 11 | | 2 | 10 | 2 | 2 | | | |
| 1967 | 14 | 50 | 12 | 7 | | 12 | 5 | | | | |
| 1968 | 18 | 37 | 12 | | 2 | 27 | 4 | | | | |
| 1969 | 24 | 40 | 4 | | | 26 | 2 | 2 | | | 2 |
| 1970 | 24 | 38 | 7 | | | 29 | | 2 | | | |
| 1971 | 23 | 28 | 13 | | | 33 | 3 | | | | |
| 1972 | 18 | 33 | 10 | 3 | 2 | 25 | 2 | 2 | | | 5 |
| 1973 | 20 | 32 | 20 | 2 | 2 | 20 | | | | | 4 |
| 1974 | 19 | 36 | 8 | 4 | 2 | 21 | 6 | | | | 4 |
| 1975 | 9 | 37 | 16 | 2 | | 19 | 5 | | | | 12 |
| 1976 | 19 | 26 | 15 | 3 | 2 | 19 | 2 | 2 | 4 | | 8 |
| 1977 | 16 | 47 | 4 | | | 18 | | | 2 | | 13 |
| 1978 | 16 | 35 | 15 | 2 | | 15 | 1 | 2 | | 1 | 13 |
| 1979 | 14 | 43 | 12 | 7 | 1 | 9 | 3 | 2 | 2 | | 9 |
| 1980 | 21 | 35 | 13 | 4 | | 11 | 7 | 3 | | 1 | 5 |
| 1981 | 14 | 37 | 17 | 6 | | 8 | 9 | 5 | | | 4 |
| 1982 | 14 | 38 | 9 | 6 | | 9 | 9 | 4 | | 1 | 10 |
| 1983 | 17 | 32 | 15 | 3 | | 11 | 4 | 6 | 2 | 1 | 9 |
| 1984 | 19 | 35 | 13 | 1 | | 11 | 7 | 2 | 2 | 1 | 9 |

Table 4. Publications, 1973-84, by category and Program[1] (see text for procedure).

| | Primary | | | | Interpretive Scientific | | | | Scientific and Technical | | | | Popular and Miscellaneous | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | GF | PSMM | FARP | EE | GF | PSMM | FARP | EE | GF | PSMM | FARP | EE | GF | PSMM | FARP | EE |
| 1973 | 2 | 8 | 1 | 3 | - | - | - | - | 10 | 13 | 8 | 1 | 1 | 3 | - | 1 |
| 1974 | 3 | 3 | 1 | 2 | - | - | - | 1 | 19 | 16 | 10 | 1 | - | 2 | - | 2 |
| 1975 | 9 | 7 | 4 | 7 | - | - | - | - | 10 | 7 | 5 | 2 | 1 | - | - | 1 |
| 1976 | 4 | 4 | 2 | 8 | 7 | 5 | 1 | 1 | 8 | 13 | 13 | 3 | - | - | - | 1 |
| 1977 | - | 4 | 4 | 6 | - | - | - | 1 | 21 | 6 | 6 | 4 | 1 | 1 | - | 3 |
| 1978 | 5 | 7 | 4 | 14 | - | - | - | - | 25 | 18 | 11 | 7 | 1 | 2 | 1 | 2 |
| 1979 | 3 | 4 | 1 | 5 | - | 1 | 1 | 1 | 43 | 26 | 16 | 7 | - | 4 | 1 | - |
| 1980 | 12 | 7 | 4 | 16 | 1 | - | 1 | 5 | 48 | 31 | 18 | 12 | 1 | 5 | 2 | - |
| 1981 | 6 | 9 | 3 | 13 | 3 | 1 | - | 1 | 50 | 34 | 20 | 18 | 3 | 2 | - | 1 |
| 1982 | 12 | 4 | 2 | 15 | 1 | 3 | - | 2 | 47 | 27 | 19 | 11 | 4 | 2 | 1 | 5 |
| 1983 | 5 | 6 | 4 | 10 | 5 | 2 | - | 1 | 39 | 32 | 19 | 7 | 8 | 3 | 3 | 6 |
| 1984 | 18 | 12 | 13 | 15 | 1 | 1 | 2 | 3 | 46 | 32 | 24 | 15 | 9 | 2 | 1 | 9 |

[1]Titles shown are those in present use (i.e. GF - Groundfish; PSMM - Pelagic Fish, Shellfish, Marine Mammals; FARP - Freshwater and Anadromous Fish; EE - Experimental Ecology).

Table 5. Publication performance, 1950-84, per professional person year (PY) utilization (non-DFO publications excluded from analysis).

| Year | PY utilization (professional) | Primary and interpretive Scientific (combined) per professional | Scientific and Technical per professional | Popular and Miscellaneous per professional | Total publications per professional |
|---|---|---|---|---|---|
| 1950 | 7.3 | - | - | .14 | .14 |
| 1951 | 9.9 | - | .51 | .20 | .71 |
| 1952 | 11.8 | - | .68 | .08 | .76 |
| 1953 | 15.1 | - | .40 | .20 | .60 |
| 1954 | 16.3 | .25 | .25 | .37 | .86 |
| 1955 | 10.8 | .19 | .28 | .65 | 1.11 |
| 1956 | 8.8 | .68 | .45 | .45 | 1.59 |
| 1957 | 11.0 | .55 | .18 | .64 | 1.36 |
| 1958 | 11.0 | .64 | .45 | 1.18 | 2.27 |
| 1959 | 10.5 | .29 | .57 | .29 | 1.14 |
| 1960 | 11.2 | .27 | .27 | .18 | .71 |
| 1961 | 12.0 | .17 | .92 | .58 | 1.67 |
| 1962 | 12.6 | .48 | .87 | .24 | 1.59 |
| 1963 | 11.7 | 1.03 | 1.20 | .43 | 2.65 |
| 1964 | 10.7 | .65 | 1.12 | .47 | 2.24 |
| 1965 | 11.0 | 1.27 | 2.09 | 1.09 | 4.45 |
| 1966 | 13.7 | .88 | 1.39 | 1.82 | 4.09 |
| 1967 | 14.2 | 1.20 | 1.20 | 1.13 | 3.52 |
| 1968 | 14.8 | .88 | 1.89 | .95 | 3.72 |
| 1969 | 17.2 | 1.05 | 1.63 | 1.05 | 3.72 |
| 1970 | 15.6 | 1.28 | 1.79 | .45 | 3.53 |
| 1971 | 18.5 | .76 | 1.62 | .32 | 2.70 |
| 1972 | 19.8 | .45 | 1.87 | .10 | 2.42 |
| 1973 | 24.8 | .56 | 1.33 | .28 | 2.18 |
| 1974 | 27.1 | .37 | 1.70 | .18 | 2.25 |
| 1975 | 28.5 | .84 | .88 | .11 | 1.82 |
| 1976 | 38.5 | .83 | 1.01 | .05 | 1.90 |
| 1977 | 37.7 | .40 | .95 | .16 | 1.51 |
| 1978 | 40.5 | .72 | 1.36 | .15 | 2.22 |
| 1979 | 52.1 | .31 | 1.69 | .10 | 2.09 |
| 1980 | 60.5 | .69 | 1.79 | .13 | 2.61 |
| 1981 | 61.9 | .57 | 1.74 | .16 | 2.47 |
| 1982 | 61.7 | .60 | 1.57 | .23 | 2.40 |
| 1983 | 61.4 | .52 | 1.52 | .44 | 2.48 |
| 1984 | 62.3 | .95 | 1.78 | .40 | 3.13 |

SUMMARY: Publication output per professional per annum (averaged)

| | Primary and interpretive Scientific (combined) | Scientific and Technical | Popular and Miscellaneous | Total publications |
|---|---|---|---|---|
| 1950-84 | 0.6 | 1.1 | 0.4 | 2.1 |
| 1950s | 0.3 | 0.4 | 0.4 | 1.1 |
| 1960s | 0.8 | 1.3 | 0.8 | 2.8 |
| 1970s | 0.7 | 1.4 | 0.2 | 2.3 |
| 1980s | 0.7 | 1.7 | 0.3 | 2.6 |

Table 6. ICNAF/NAFO and CAFSAC documents, 1949-84, as percentages of total publications.

| | ICNAF/NAFO | | CAFSAC | | Other | | |
|---|---|---|---|---|---|---|---|
| Year | No. | % of total publs. | No. | % of total publs. | No. | % of total publs. | Total publications |
| 1949 | - | - | - | - | 1 | 100 | 1 |
| 1950 | - | - | - | - | 1 | 100 | 1 |
| 1951 | - | - | - | - | 7 | 100 | 7 |
| 1952 | 5 | 56 | - | - | 4 | 44 | 9 |
| 1953 | 5 | 56 | - | - | 4 | 44 | 9 |
| 1954 | 2 | 14 | - | - | 12 | 86 | 14 |
| 1955 | 2 | 17 | - | - | 10 | 83 | 12 |
| 1956 | 2 | 13 | - | - | 13 | 87 | 15 |
| 1957 | 2 | 13 | - | - | 13 | 87 | 15 |
| 1958 | 4 | 16 | - | - | 21 | 84 | 25 |
| 1959 | 6 | 50 | - | - | 6 | 50 | 12 |
| 1960 | 3 | 38 | - | - | 5 | 62 | 8 |
| 1961 | 9 | 45 | - | - | 11 | 55 | 20 |
| 1962 | 10 | 50 | - | - | 10 | 50 | 20 |
| 1963 | 14 | 45 | - | - | 17 | 55 | 31 |
| 1964 | 10 | 42 | - | - | 14 | 58 | 24 |
| 1965 | 22 | 45 | - | - | 27 | 55 | 49 |
| 1966 | 12 | 21 | - | - | 44 | 79 | 56 |
| 1967 | 20 | 40 | - | - | 30 | 60 | 50 |
| 1968 | 16 | 28 | - | - | 41 | 72 | 57 |
| 1969 | 16 | 25 | - | - | 48 | 75 | 64 |
| 1970 | 19 | 35 | - | - | 36 | 65 | 55 |
| 1971 | 30 | 60 | - | - | 20 | 40 | 50 |
| 1972 | 29 | 60 | - | - | 19 | 40 | 48 |
| 1973 | 35 | 57 | - | - | 26 | 43 | 61 |
| 1974 | 33 | 52 | - | - | 30 | 48 | 63 |
| 1975 | 21 | 39 | - | - | 33 | 61 | 54 |
| 1976 | 21 | 28 | - | - | 54 | 72 | 75 |
| 1977 | 19 | 32 | 10 | 17 | 31 | 51 | 60 |
| 1978 | 29 | 31 | 19 | 20 | 46 | 49 | 94 |
| 1979 | 45 | 39 | 24 | 21 | 47 | 40 | 116 |
| 1980 | 47 | 28 | 29 | 18 | 90 | 54 | 166 |
| 1981 | 50 | 31 | 31 | 20 | 78 | 49 | 159 |
| 1982 | 45 | 28 | 26 | 16 | 91 | 56 | 162 |
| 1983 | 40 | 24 | 32 | 20 | 92 | 56 | 164 |
| 1984 | 65 | 31 | 33 | 16 | 111 | 53 | 209 |

ICNAF - International Commission for the Northwest Atlantic Fisheries
NAFO - Northwest Atlantic Fisheries Organization
CAFSAC - Canadian Atlantic Fisheries Scientific Advisory Committee

Anadromous, Freshwater Fish

The earliest biological studies of Atlantic salmon were carried out by staff of the Biological Laboratory, Bay Bulls in 1931 and the first publication, by Lindsay and Thompson, appeared the following year. Valuable data on freshwater fish were lost in the 1937 fire which destroyed the Bay Bulls facility and it was not until 1939 that salmon and trout investigations commenced on a permanent basis. N. Frost published several articles on trout in the late 1930s but early studies were concerned more with the biological characteristics of salmon inshore and later (late 1940s) with river obstructions and improvements through fishways. A. A. Blair joined the staff in 1939 and published results from these early salmon investigations in 1942 and 1943.

Salmon research was expanded in 1949-50 to include studies on west coast Newfoundland rivers and the relationship between river populations and commercial fisheries. Counting fences were installed to examine freshwater productivity and the influence of deteriorating river conditions on salmon abundance. A. R. Murray was hired in 1953 and by the mid-1950s the results of river and tagging surveys appeared in the literature. The 15 m research vessel PARR was employed on salmon studies between 1946 and 1960.

Short-term attention was given to the Arctic charr fishery in northern Labrador in 1953-54, resulting in Andrews and Lear's paper in 1956. No further studies were made of Arctic charr until 1973 and these were initiated by the Resource Development Branch prior to joining the Fisheries Research Branch in 1975. Biological studies of Arctic charr and the northern Labrador fishery have continued from 1973 to the present day (see publications by Coady; Dempson).

Pacific pink salmon were first introduced to North Harbour River, St. Mary's Bay in 1959 and the results of this and subsequent transplants reported by Blair and later, Lear. The pink salmon project was phased out in the mid-1970s. Recent overviews were prepared by Lear (1980) and Dempson (1980).

Anadromous fish investigations expanded in 1967 and research emphasis shifted from freshwater to the oceanic life of the Atlantic salmon. By 1969, virtually all research was directed to the effects of high seas fisheries on Canadian salmon stocks. The research vessel A. T. CAMERON made its first salmon trip to West Greenland in 1969 to examine the effects of the Danish fishery and considerable emphasis was given in subsequent years to techniques to identify the continental origin of species. Authors contributing to these efforts include Templeman, May, Lear, Pippy, Nyman, Payne, and Reddin. Biological sampling at West Greenland has continued to the present day. Major studies of anadromous salmon by the Resource Development Branch, such as those of Sandhill River (1969-73) and Western Arm Brook (1971-present) contributed significantly to the understanding of distant and local exploitation of salmon populations by commercial fisheries.

The Resource Development Branch (now the greater part of the Freshwater and Anadromous Fish Program) joined the organization in late 1975. Prior to joining the Fisheries Research Branch, general emphasis was given to stream reconnaissance and remedial efforts in support of salmon enhancement, as well as pollution surveys (see also Resource Development, Enhancement, Aquatic Impact Assessment and Toxicology/ Pollution). The bulk of stream reconnaissance data has been published in the form of stream catalogues (Appendix 3: Porter et al. (1974); Murphy et al. (1974)). In addition, biological studies were undertaken of trout and other resident salmonids in lakes and ponds throughout Newfoundland and Labrador (see Bruce, Morry, Ryan, Whelan, Wiseman).

Anadromous and freshwater publications in the past 20 years represent 15-20% of the Branch's annual publication output (Table 3). Following the addition of Resource Development personnel and the amalgamation of anadromous and freshwater researchers under a single program, there has been a gradual decrease in research on resident freshwater species. As of 1983, trout studies have essentially terminated. In the same period, increasing priority has been given to Atlantic salmon assessments in support of fisheries management. Assessment documents are published through CAFSAC and ICES and involve analyses of trends in catch statistics, evaluations of spawning escapements at fishways and counting fences, smolt counts and electrofishing. Additional efforts have been directed to the life history, biology, stock identification and stock characteristics of Atlantic salmon in the marine environment of the Northwest Atlantic (see papers by Chadwick, Gibson, Meerburg, O'Connell, Pepper, Pippy, Porter, Reddin).

## Groundfish

In 1983, four-fifths of seafish landings in the Newfoundland and Labrador fishery were groundfish and three-quarters of groundfish landings were cod. The overwhelming significance of groundfish in the fishing economy of the area is reflected in the organization and activities of the Fisheries Research Branch and its predecessors over the past 50 years (Appendix 5).

Early attention was given to the life history, movements and availability of cod and other groundfish species. From 1931 to 1935, trawl surveys were undertaken several months each year from the chartered vessel CAPE AGULHAS. Four lists of fishes appear in the annual reports of the laboratory from 1931 to 1935 and more encompassing publications on haddock, cod and flatfish were prepared by Thompson (1939, 1943) and Frost (1938, 1940). Although Thompson departed for Australia in the fall of 1936, he maintained an interest in haddock and cod in Newfoundia waters and published 1938 and 1943 articles in the Newfoundland Research Bulletin series.

Prior to 1949, technological advances were realized in groundfish product quality and the use of by-products. The early papers of MacPherson from 1931 to 1937 were extended by Hampton (1938 to 1940) and Wilson (1938, 1939).

The fire of 1937 and the lack of a research vessel during the war years handicapped groundfish studies and it was not until the launch of the INVESTIGATOR II in 1946 that activities were resumed. The availability of a full-time research vessel represented a turning point in the expansion of groundfish survey coverage and the extension of research interests to groundfish species other than cod. Biological attention was given to all species encountered during exploratory cruises and data files grew. Routine hydrographic data series were initiated and the role of environmental variables on the availability of commercial species assumed increasing importance in studies of fish distribution and early life history.

Groundfish research prior to 1950 included work on cod, haddock, American plaice and rosefish (redfish), although the latter three fisheries were relatively insignificant and in an early stage of development. During the 1950s, researchers were instrumental in the location of many new fishing grounds and the transfer of new fishing methods (e.g. trawling, longlining, seining) to the fishing industry; Templeman, Fleming, MacPherson and Stewart reported on longlining and other experiments during that period.

With the formation of ICNAF in 1949, scientists took an increasingly active role in ICNAF Subcommittees and virtually half of all publications (mostly groundfish and related studies) were vetted through that group until the formation of CAFSAC in 1977 (Table 6). A. M. Fleming was instrumental in establishing sampling and statistical systems in 1954 and, commencing that year, detailed annual reviews of landings, fishing effort and catch per unit effort were submitted to ICNAF. Annual Canadian research summaries and statistical reports inaugurated for ICNAF in the 1950s by Templeman and Fleming persist today under NAFO cover.

The A. T. CAMERON was launched in 1958, extending offshore and northern research capabilities. By the early 1960s research attention had turned to the improvement of scientific assessment procedures, predictions of maximum sustainable yield and the provision of advice to national and international fisheries managers on minimum mesh size and other regulatory measures (see Hodder 1962 and 1963, and Hodder and May 1964 and 1965). General emphasis was given to stock discrimination techniques, migration patterns and the influence of the environment and fishery on fish populations.

The heavy international exploitation of groundfish resources by the late 1960s led to the introduction of TACs (total allowable catches) in 1974 and increased research emphasis was given to more precise estimates of resource prospects on a stock and area basis. These measures, of themselves, failed to control over-exploitation of stocks and Canada extended fisheries jurisdiction to 200 miles in 1977. The extension of jurisdiction brought infusions of research resources (e.g. long-term charter of GADUS ATLANTICA, staff increases) and offshore research and stock assessment efforts increased to a significant degree. On Canada's Atlantic coast, 90% of commercially important fish stocks are concentrated within the 200-mile limit and immediate attention was given to the rebuilding of depleted stocks. More and more, with the formation of CAFSAC, the replacement of ICNAF with NAFO and other initiatives, groundfish research attention turned to management issues. By 1980, virtually 80% of research activities in the Newfoundland Region were geared to resource assessment and related activities.

Detailed observations on groundfish stocks and their environment are recorded during regular research vessel cruises utilizing commercial gear to sample pre-recruit abundance. These are supplemented by regular studies at principal landing ports in Newfoundland and Labrador on catches by commercial fisheries, as well as commercial sampling at sea and specific studies of by-catch and discard problems throughout the fishery (see Stevenson, Kulka). Regular stock inventories are taken to ensure the best current estimates of stock abundance for prediction of yields and for annual quota adjustment of particular stocks.

For the past three decades, the biology and assessment of gadoids has been of paramount interest and the majority of groundfish publications in that period deal directly or indirectly with cod. The reader is referred to articles by Templeman, Fleming, Pinhorn, Wells, May, Lear, Bishop, Lilly and Gavaris. Early studies on haddock were reported by Hodder, Templeman and Wells but the haddock fishery has diminished in significance since 1960.

Minimal attention was directed to flatfish species other than American plaice until the mid-1960s. Greenland halibut (turbot) investigations commenced in 1966 as a result of a growing inshore fishery and the first published articles on the species appear in 1968. Publications on yellowtail flounder first appear in 1970 (Pitt) and on witch in 1973 (Pitt). The principal flatfish authors since 1960 include Templeman, Pitt, Lear, Bowering, Brodie and Walsh.

With the exception of a brief lapse between 1970-72, redfish studies have been ongoing since 1946 (see Templeman, Sandeman, Parsons, McKone, Atkinson, NI, and Gavaris). General emphasis, in recent years, has been given to speciation and stock segregation problems and the unique reproductive biology of the species.

Continued improvements have been realized in statistical and modelling procedures utilized in the biological assessment of groundfish resources. For specific references in this area, see recent papers by Misra, Gavaris, Smith, Baird and Brodie.

From 1950 to 1968, groundfish publications averaged 50-60% of Branch publication output (Table 3). The expansion of the pelagic and invertebrate programs in the late 1960s and the start-up of research on West Greenland salmon necessitated the transfer of groundfish resources, and publication levels since 1968 represent an average 30-35% of Branch publications.

Invertebrates

Included under this heading are biological research and resource assessment studies of invertebrate species. Plankton investigations are described under Fisheries Ecology and mariculture efforts under Aquaculture.

In 1934 and 1936, Frost provided detailed taxonomic descriptions of giant squid washed up on Newfoundland shores. These articles appear as appendices in laboratory annual reports and received only limited circulation.

Thompson authored a memorandum on the lobster industry in Newfoundland in 1934 and a review of lobster research is provided by Whiteley in the laboratory's annual report for 1935. Templeman had undertaken studies of lobsters in the Gulf of St. Lawrence prior to his arrival in 1938 and published extensively on the life history and regulation of the fishery in Newfoundland waters from 1939 to 1948. The first distinct invertebrate program appears in the Branch organization in 1959 (Appendix 5) and by 1961, lobster investigations had been renewed after a lapse of 12 years. H. J. Squires headed up invertebrate studies in this period and published several articles on lobster from 1966 to 1971. G. P. Ennis joined the research staff in 1968 and has been the principal lobster researcher in the Branch since that time.

The first detailed description of the bait squid in the Newfoundland area was provided by Squires in 1957. Coastal and offshore investigations were added to the commercial invertebrate program in 1965. M. C. Mercer joined the group that year and from 1965 to 1975 reported on the biology, fisheries, early life history and systematics of the Cephalopoda in eastern Atlantic waters. A review of the squid fishery and general biological consideration of the species in Newfoundland waters were provided by Ennis in 1978 and 1979. Squid research responsibilities were subsequently assumed by G. Hurley and later, E. G. Dawe.

Squires reported on exploratory fishing for giant scallops on the west and southwest coasts of Newfoundland in 1958 and published a bulletin on the species in 1962. Mercer examined the natural mortality of Iceland scallops in the Gulf of

St. Lawrence in 1974. The following year, K. S. Naidu was hired as the first full-time scallop biologist. Early attention was given to mariculture prospects for scallops but since 1980, more serious attention has been given to the assessment of stock sizes and prediction of yields.

Investigations on the abundance and distribution of snow (queen) crabs commenced in 1968. Exploratory survey results, trap mesh selection and other studies in support of regulatory functions have been reported by R. J. Miller (from 1973). Several articles on spider crabs (Miller, again) appear from 1975 to 1977. From 1978 to present, D. M. Taylor has been the principal crab researcher.

Shrimp surveys were undertaken in the Newfoundland fishing area in 1957 and 1958 and described by Squires (1961). Additional exploratory fishing commenced in 1968. Assessments of shrimp on the Labrador Shelf and in the Gulf of St. Lawrence were reported by E. J. Sandeman in 1978. Subsequent articles, to 1984, have been authored by D. G. Parsons.

With the exception of scallops, very few studies have been made of bivalve mollusks in Newfoundland waters. Various development efforts have been carried out by the provincial government and Memorial University. Branch researchers were involved in resource surveys of intertidal clams, 1971-73 (unpublished data) and the results of experimental transplants of oysters to the wild were reported by Squires (1965 and 1966) and Mercer (1969 and 1970).

The only publication dealing with echinoderms is a 1973 report by Miller and Bishop entitled "A Sea Urchin Fishery for Atlantic Canada".

From 1960 to 1984, invertebrate publications constitute 10-15% of the Branch's annual publication output (Table 3). The basic thrust in shellfish research in recent years has been to provide high quality advice to fisheries managers, including alternative options and techniques for managing these resources. This is accomplished through monitoring stocks by periodic assessment of stock sizes and predicting yields, by continuously refining the methodologies involved and by continued basic research for refining estimates of the biological parameters used in assessment models. Standard population models are used for the most part with specific modification and customizing of applicable parameters as they pertain to invertebrate species.

## Marine Mammals

D. E. Sergeant was employed as a whale biologist with the laboratory from 1951 to 1955 and provided general overviews of the Newfoundland whaling industry in 1951 and 1953 and (with Fisher) in 1954. Williamson published incidental field observations on marine mammals in 1961 and 1963, Mercer in 1967 and 1973, and Lear and Christensen in 1974 and 1975.

Only minor attention was given to marine mammal research by Newfoundland-based researchers until the late 1970's when research responsibilities for harp and hooded seals and Atlantic whales were transferred from the Arctic Biological Station at Ste. Anne de Bellevue (Quebec) to St. John's.

G. H. Winters reported on estimates of mortality rates, sustainable yield, and surplus production of Northwest Atlantic harp seals in 1976, 1978, and 1979, and on hooded seals, with Bergflódt, in 1978. W. D. Bowen and K. A. Hay were recruited in the fall of 1978 and initiated detailed studies of the biology, ecology and population dynamics of harp seals and whales, respectively.

The Branch has contracted a number of studies on whale ecology and entanglement in inshore fixed gear in recent years. The reader is referred to Whitehead et al. (1979, 1980, 1981, 1982) and Lien et al. (1980, 1982).

In harp seal research, the principal approach has been to estimate pup production by means of mark-recapture methods and age composition data. From estimates of pup production, the population size may be derived with considerable accuracy. General attention has been given in recent years to simulation models to examine the influence of changes in vital rates on population trajectory in relation to given levels of harvest. Long-term studies of diet and changes in condition which may affect reproductive potential and yields have been initiated and will be published over the next several years.

Whale research declined in 1982 in favor of studies on hooded seals. The first aerial photographic surveys of hooded seals in Davis Srait and off the northeast Newfoundland coast were made in 1984 to examine stock relationships and pup production.

## Marine Plants

Squires (1966) provided a brief description of experimental harvesting of Irish moss in Port au Port Bay and aspects of the ecology of Irish moss were examined, under contract, by Lilly (1968). Miller and Mann's (1972, 1973) and Black's (1974, 1976) papers on seaweeds, noted in Table 3, were not based on studies in Newfoundland waters.

Very little commercial use is made of marine plants in Newfoundland. Quantitative surveys were made of Irish moss on the west coast of Newfoundland by the Marine Sciences Research Laboratory, Memorial University (mid-1970s) but Branch participation in these or related studies has been negligible.

## Pelagic Fish

Herring, capelin and mackerel are the principal commercial pelagic fish species in the Newfoundland area. Capelin are also important biologically as a prey species, as are sand launce.

With the exception of two comprehensive articles on capelin (Sleggs 1932; Templeman 1948), there were no research publications on the biology of pelagic species until the late 1950s. Newfoundland herring investigations were reported in annual reports as early as 1932 but no publications appeared in these early years.

Pitt's graduate thesis on the biological characteristics of Grand Bank populations of capelin in 1956 led to two follow-up primaries in 1958. Olsen published information on mesh selection in herring gillnets in 1959 and added information on the biology of the species in 1961. Williamson gave a general account of bluefin tuna in Newfoundland waters in 1962 but no subsequent research has been carried out on the species by FRB researchers.

Research on pelagic species, particularly herring and capelin, was expanded in 1965 and the following year, several researchers were assigned to the Pelagic Program. V. M. Hodder undertook herring studies and reported findings from 1966 to 1972. Additional contributions on herring were made by Hourston, 1966-69. Winters commenced studies on capelin in 1966 and has published on capelin and other pelagic species to 1984 (capelin since 1966, herring since 1970, sand launce since 1970). Templeman added material on capelin in 1967 and 1968. By 1970, L. S. Parsons was involved in herring and mackerel studies. J. A. Moores took the lead with mackerel in 1972 and published on the species until 1983. J. S. Campbell published material on capelin in 1973 and 1974.

Since 1976, capelin and herring investigations have been headed up by J. E. Carscadden. The two basic methods utilized in pelagic assessments are acoustic and analytical models. Research vessel surveys utilizing mid-water and bottom trawls are carried out, as well as regular sampling of the commercial fisheries at selected locations. For information on capelin, since 1976, the reader is referred to Carscadden, Miller and Nakashima. Miller first reported on the acoustic assessment of pelagic fish in 1978 and these studies are ongoing. Herring references in the same period appear under Carscadden, Wheeler and Moores.

## Fisheries Ecology

Included here are ecological, multispecies and predator-prey studies in support of resource assessment, as well as aquatic climate studies relevant to fisheries. Plankton and production studies are also referenced.

Researchers have long recognized the influence of temperature and other variables on fish distribution and abundance. As early as 1932, Sleggs reported on the relationship of the cod fishery to water temperature. Similar observations, dealing with cod and other species, have been published by various researchers (Templeman and Fleming 1953; Templeman 1965, 1966; May et al. 1965; Hodder 1965; Squires 1967; Lear and Pitt 1971; Buchanan et al. 1982; Lear 1983; Leggett et al. 1984; Pinhorn and Halliday 1984).

Frost undertook the first plankton investigations by the laboratory and prepared a research bulletin on Amphipoda and decapod larvae in 1936. In 1938, she reported on the genus *Ceratium* and its use as an indicator of hydrographic conditions in Newfoundland waters. No other plankton studies appear until Squires' reports on the decapod Crustacea of the CALANUS expeditions in the eastern Arctic. He first published on CALANUS collections in 1956 and continued to extract primary material until 1969.

Surprisingly little attention was given to fish eggs and larval studies until the mid-1970's when attention turned to multispecies and

ecosystems issues (see Anderson, Penney to 1984). The only earlier studies are those of Squires who reported on cod eggs and herring larval studies in the Gulf of St. Lawrence in 1957 and Wells (1965) who provided information on fish eggs and larval collections from West Greenland waters.

Templeman (1975 and 1976) described the background of the Flemish Cap as an area for research on year-class success and failure in cod and redfish and an International Flemish Cap Project was ratified in May 1977 to examine the causes of fluctuations in year-class strength in the area. Data relevant to the project (to 1984) have been reported by Anderson, Wells and Akenhead.

Oceanographic data collected by the laboratory in the course of trawl survey cruises and dedicated annual hydrographic surveys are registered with the Marine Environmental Data Service (MEDS), Department of Fisheries and Oceans, Ottawa, and information is available on request. Annual summaries of hydrographic observations are also reported to NAFO (see Templeman 1967 to 1975; annual NAFO Research Summaries).

Multispecies studies by Branch researchers date from the mid-1970s. Mercer (1974, 1975) examined interactions of the pilot whale and squid. Whitehead et al. (1979) reported on baleen whales in the ecosystem based on spawning capelin. Fitzpatrick and Miller (1979) reviewed existing information on the spawning times and locations of commercial finfish. An international workshop on multispecies approaches to fisheries management advice was held in St. John's in 1979 and proceedings published in 1982 (Mercer; editor). Since then, species interactions, predator/prey relationships, and trophic studies have been expanded to include publications on groundfish (Lilly, Bowering), squid (Dawe), shrimp (Parsons), and salmon (Reddin).

Since 1978, researchers in the Fisheries Ecosystems Section have reported on global and regional approaches to the understanding of complex marine ecosystems in the Northwest Atlantic. A wide variety of study approaches, including broad survey as well as process-oriented research, have been used to address recruitment mechanisms, species interactions, larval fish ecology, ocean climate, fisheries oceanography and physical oceanography (see Akenhead, Anderson).

## Aquaculture

With the exception of trial introductions of the American oyster in the early 1960s (see articles by Squires 1965, 1966; Mercer 1969, 1970; as well as Appendix 3 articles by Aldrich/Percy/Scaplin from 1965 to 1978) and the development of culture techniques for the sea scallop (refer to Naidu papers from 1976), minimal research attention has been given to aquaculture prospects in Newfoundland waters. There are no federal salmonid hatcheries in the province and most developmental efforts have been provincial initiatives.

Sandeman and Cutting (1972) described the regional position and biological considerations concerning aquaculture prospects. ShawMont Nfld. Ltd. was contracted to undertake a feasibility and site selection study for a multi-purpose fish rearing facility and reported findings in a two-volume 1979 report. The cage rearing of rainbow trout in a brackish water pond was examined by Jamieson (1980) and a study of aquaculture prospects in Holyrood Pond was prepared by Dobrocky Seatech in 1981.

Significant research contributions in support of salmon aquaculture have been made in the area of fish disease. The Newfoundland Technological Unit which joined the Branch in 1971 was renamed Microbial Chemistry in 1976. Attention shifted to fish health research and by 1980, biochemical studies on the endotoxins of fish pathogens appear in Branch publication listings. These studies are aimed at understanding the interactions of fish pathogens with the defense mechanisms of fish. As such, they will hopefully explain the general lack of success of fish vaccines to date and serve as a basis for the development of a semi-synthetic antigen. For further information, the reader is referred to articles by Shaw, Bancub and Michon.

## Resource Development, Enhancement

The Resource Development Branch (now Freshwater and Anadromous Fish Program) joined the organization in late 1975. From 1954 to 1975, the group was heavily involved in biological and engineering studies of selected watersheds and the development of techniques to increase salmonid production, responsibilities which have been carried over within the new organization. Publications to 1975 appear in Appendix 3.

Farwell and Porter (1976) outlined Atlantic salmon enhancement techniques in Newfoundland.

investigations on the utilization of standing water areas such as ponds, as nursery areas for Atlantic salmon in insular Newfoundland were first described by Pepper (1976) and studies are ongoing.

Since 1976, FAHP has been heavily involved in the planning and implementation of salmonid enhancement projects and the preparation of comprehensive cost effective programs for application throughout Newfoundland and Labrador freshwater areas. Scientific and technical information and advice are provided to projects and training programs are conducted. A major milestone was reached in 1984 with the preparation, by a federal/provincial Working Group on Newfoundland Salmon Enhancement (non-government members as well), of a comprehensive ten-year plan entitled Salmon Resource Development in Newfoundland and Labrador (see Anon. 1984; compiled by J. D. Pratt).

General studies on the incidence and geographic distribution of salmonid diseases throughout Newfoundland and Labrador are largely lacking. Several papers, dealing with IPNV (infectious pancreatic necrosis virus) and related topics were published by Cone between 1980 and 1982.

## Aquatic Impact Assessment

Aquatic impact assessment includes research and the provision of scientific advice on the implications to fisheries of physical alterations of habitat. Chemical influences are covered under Toxicology and Pollution.

The advent of environmental assessment legislation in the 1970s and regulatory responsibilities associated with the management and protection of fish habitat under the Fisheries Act have increased project referral-type workloads and there has been a rapid escalation in the number of energy, marine transportation, mining, forestry, rural infrastructure, highway construction, and urbanization proposals affecting the Region's productive fish habitat. Logically, these factors have increased demands in anticipatory planning, habitat restoration and investigatory research.

Prior to 1976, freshwater habitat responsibilities rested with the Resource Development Branch, an arrangement reflecting the importance of habitat deterioration on salmonid productivity throughout the Province. With the exception of guidelines on fish habitat protection for construction and forestry (Rowe, L. 1974 and Rowe, D. 1975), the bulk of RDB publications dealing with habitat assessment (Appendix 3) centered on the impact of hydro developments (Taylor 1959; Farwell 1972; Bruce et al. 1975).

With the amalgamation of RDB/FRB in 1975, activities have been extended to include marine habitat assessment and other issues. Publications of note include Case and Rowe's 1978 environmental guidelines for resource road construction; a 1980 brief to the Newfoundland and Labrador Royal Commission on Forest Protection and Management (Anon; edited by Coady and Scarratt) which outlines both physical and chemical concerns associated with harvesting and management practices; a 1982 study of the influence of controlled discharges from the Churchill Falls mega-hydro project on Lake Melville and Groswater Bay, Labrador (Bobbitt and Akenhead); a 1983 report on urban development guidelines for the protection of fish habitat (Anon; report by LGL Ltd.); a contracted study by LGL (1984) dealing with instream flow incremental methodology and microhabitat utilization criteria for Atlantic salmon; and a review of environmental risks from offshore exploration outlined in a joint DFO/DOE submission to the Ocean Ranger Commission (see Anon 1984; edited by Wiseman and Côté).

## Toxicology and Pollution

Publications dealing with the effects of man-induced chemical changes on fish and fish habitat are included under toxicology and pollution (cf. aquatic impact assessment).

Vavasour and Blair undertook comprehensive pollution surveys of Humber Arm and Exploit's River in the early 1950s and findings were reported in 1955. About this period, the Resource Development Branch was created (independent of the Biological Station) and assumed responsibilities for studies of the influences of mining, forestry and other industrial activities on fish habitat. Publications of the Pollution Unit, RDB, appear in Appendix 3 (see Cowley 1962, 1963; Hatfield 1968, 1969; Riche and Coady 1969; Chamut 1970; Mascaluk and Chamut 1970; Villemere 1970; Addison et al. 1971, 1972; Chamut et al. 1972; Whalen 1972; Wilson 1972). These reports deal with pollution investigations of the Exploits River, (mining, pulp and paper), Humber Arm (pulp and paper), and Placentia Bay (effects of elemental phosphorus) and include studies of the aerial spraying of Newfoundland forests, DDT larviciding in Labrador

and problems associated with a marine thermal generating station in Conception Bay.

In April 1972, regulatory responsibilities associated with the effects of deleterious substances were transferred to the newly-formed Environmental Protection Service. That same year, the environmental program at the Biological Station was expanded to examine natural and man-made contamination of the Newfoundland marine environment. The earliest publications following the creation of the Environmental Quality group (later Experimental Ecology Program) were those of Hodder et al. (1972) and Pippy et al. (1972) dealing with the results of the 1969 phosphorus pollution crisis in Placentia Bay. Later publications deal with the application of biochemical, physiological and ecological concepts to environmental issues and include, to 1984, papers by Penrose, Payne, Kiceniuk, Dey and Dawe. Particular emphasis, in recent years, has been given to hydrocarbon-related research.

Various compendia of water quality data (baseline surveys, as well as specific studies) are available in reports by Jamieson (1974 and 1975; Appendix 3) and 1979 (Appendix 1). A detailed examination of mercury levels in Labrador fish is provided by Bruce et al. (1979).

Acid precipitation research has been ongoing since 1981 and deals largely with the inventory of selected lakes throughout Newfoundland and Labrador to determine their sensitivity to acid rain. Surveys of headwater lakes, with specific attention to acid precipitation, were provided by Scruton (1983, 1984). Research activities in the Newfoundland Region were also outlined in briefs to the Royal Society of Canada and the Parliamentary Subcommittee on Acid Rain of the Standing Committee on Fisheries and Forestry (see Scruton 1984).

Other (miscellaneous)

The previous analyses, by program activity, convey structured impressions of the nature of research publications since 1931. Many publications do not fit the categories applied. Seafood technology papers, for example, no longer fit the administrative definition of fisheries research and were not described in detail. The following notes may help:

- seafood technology; see Appendix 2 and papers by Shaw and Botta (1971-80)
- a comprehensive Bulletin on marine resources in the Newfoundland and Labrador area was completed by W. Templeman in 1966 and updated in a 1976 Bulletin edited by A. T. Pinhorn
- parasitology; see Templeman (1957, 1960, 1963), Squires (1966) and Bourgeois and Ni (1984) for key groundfish studies, Parsons and Hodder (1971) re herring and Pippy/Nyman (1969-75), as well as Cone and Ryan (1984) re salmonids
- sharks; see Hampton (1938), Templeman (1944, 1954, 1958, 1976, 1984) and Walsh (1982) re dogfish shark and Templeman's 1963 bulletin on sharks in the Canadian Atlantic
- skates; see Templeman (1965, 1973, 1982, 1984) and McKone (1983)
- grenadier; see Pinhorn (1974), Parsons et al. (1978), and Atkinson (from 1979)
- seabirds (incidental observations in the course of fisheries surveys); see Templeman (1944), Tuck and Squires (1950), Sergeant (1952), Rees (1961, 1963, 1964), May (1967).
- Annual reports are extremely valuable sources of information on research activities and should not be overlooked. With the exception of the six-year period between 1938 and 1943, and the years 1947 and 1948, annual reports were prepared every year between 1931 and 1976. Annual Program Review and Evaluation (PRE) documents which describe research activities on a project-by-project basis have been prepared since 1976, but were not bound as formal reports until 1981.
- Research summaries submitted annually to NAFO and ICES contain useful references to research activities in the Newfoundland area.

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Appendix 1. Publications of the Fisheries Research Branch, 1931-84.

Legend

1 - Primary
2 - Interpretive scientific
3 - Scientific and technical
4 - Popular and miscellaneous

* - non-OFO authors

G - Groundfish Program
P - Pelagic Fish, Shellfish, Marine Mammals Program
F - Freshwater and Anadromous Fish Program
E - Experimental Ecology Program
O - Other

## PUBLICATIONS - 1931

4 Thompson, H. 1931. A survey of the fisheries of Newfoundland and recommendations for a scheme of research. Newfoundland Department of Natural Resources Economic Bull. 1: 1-63 [formerly Reports of the Newfoundland Fishery Research Commission Vol. 1(1)].

## PUBLICATIONS - 1932

4 Anon. 1932. Annual Report - Year 1931. Reports of the Newfoundland Fishery Research Commission Vol. 1(4): 110 p. [report of Biological Laboratory, Bay Bulls, Newfoundland; includes summaries of technical, hydrographic, and biological investigations].

3 Anon. 1932. First list of fishes in the Newfoundland fishing area, Appendix D, p. 107-110. In Annual Report - Year 1931. Reports of the Newfoundland Fishery Research Commission Vol. 1(4).

3 Lindsay, S. T., and H. Thompson. 1932. Biology of the salmon (Salmo salar L.) taken in Newfoundland waters in 1931. Newfoundland Fishery Research Commission Research Bull. 1: 80 p. [formerly Reports of the Newfoundland Fishery Research Commission Vol. 1(2)].

3 *Sleggs, G. F. 1932. A study of the relation of cod-fishery to water temperatures at Raleigh, Newfoundland, 1929, Appendix C, p. 99-106. In Annual Report - Year 1931. Reports of the Newfoundland Fishery Research Commission Vol. 1(4).

3 *Sleggs, G. F. 1932. Observations on the economic biology of the caplin (Mallotus villosus, O. F. Müller). Newfoundland Fishery Research Commission Research Bull. 2: 66 p. [formerly Reports of the Newfoundland Fishery Research Commission Vol. 1(3)].

## PUBLICATIONS - 1933

4 Anon. 1933. Annual Report - Year 1932. Reports of the Newfoundland Fishery Research Commission Vol. 2(1): 127 p. [report of the Biological Laboratory, Bay Bulls, Newfoundland; includes summaries of technical, hydrographic, and biological investigations].

3 Anon. 1933. Second list of fishes in the Newfoundland fishing area, Appendix D, p. 125-127. In Annual Report - Year 1932. Reports of the Newfoundland Fishery Research Commission Vol. 2(1).

1 MacPherson, N. L. 1933. Vitamin A concentrations of cod liver oil correlated with age of cod. Nature 132: 26-27.

## PUBLICATIONS - 1934

4 Anon. 1934. Annual Report - Year 1933. Reports of the Newfoundland Fishery Research Commission Vol. 11(2): 117 p. [report of the Biological Laboratory, Bay Bulls, Newfoundland; includes summaries of technical, hydrographic, and biological investigations].

3 Anon. 1934. Third list of fishes in the Newfoundland fishing area, Appendix D, p. 115-117. In Annual Report - Year 1933. Reports of the Newfoundland Fishery Research Commission Vol. 11(2).

3 Frost, N. 1934. Notes on a giant squid (Architeuthis sp.) captured at Dildo, Newfoundland, in December, 1933, Appendix C, p. 100-114, Plates I-III. In Annual Report - Year 1933. Reports of the Newfoundland Fishery Research Commission Vol. 11(2).

3 Thompson, H. 1934. Memorandum on the lobster industry in Newfoundland. Newfoundland Fishery Research Commission Service Bull. 2: 23 p.

PUBLICATIONS - 1935

4 Anon. 1935. Annual Report of Fishery Research Laboratory - 1934. Newfoundland Department of Natural Resources, Division of Fishery Research Vol. II(3): 80 p. [report of Fishery Research Laboratory, Bay Bulls, Newfoundland; includes summaries of technical, hydrographic, and biological investigations].

3 Anon. 1935. Fourth list of fishes in the Newfoundland fishing area, Appendix D, p. 79, Plates I-II. In Annual Report of Fishery Research Laboratory - 1934. Newfoundland Department of Natural Resources, Division of Fishery Research Vol. II(3).

3 MacPherson, N. L. 1935. The dried codfish industry. Newfoundland Department of Natural Resources Service Bull. 1: 56 p.

3 Vladykov, V. D. 1935. Two new subspecies of Lumpenus lampetraeformis (Walbaum) from North America, Appendix C, p. 75-78. In Annual Report of Fishery Research Laboratory - 1934. Newfoundland Department of Natural Resources, Division of Fishery Research Vol. II(3).

PUBLICATIONS - 1936

4 Anon. 1936. Annual Report of Fishery Research Laboratory - 1935. Newfoundland Department of Natural Resources, Division of Fishery Research Vol. II(5): 95 p. [report of Fishery Research Laboratory, Bay Bulls, Newfoundland; includes summaries of technical, hydrographic, and biological investigations].

3 Frost, N. 1936. A further species of giant squid (Architeuthis sp.) from Newfoundland waters, Appendix D, p. 89-95. In Annual Report of Fishery Research Laboratory - 1935. Newfoundland Department of Natural Resources, Division of Fishery Research Vol. II(5).

3 Frost, N. 1936. (Faunistic Series, No. 1). I. Amphipoda from Newfoundland waters with a description of a new species. II. Decapod larvae from Newfoundland waters. Newfoundland Department of Natural Resources Research Bull. 3: 24 p.

3 Whiteley, G. C. 1936. Newfoundland lobster investigations, Appendix C, p. 75-88. In Annual Report of Fishery Research Laboratory - 1935. Newfoundland Department of Natural Resources, Division of Fishery Research Vol. II(5).

PUBLICATIONS - 1937

4 Anon. 1937. Annual Report of Fishery Research Laboratory - 1936-37. Newfoundland Department of Natural Resources, Division of Fishery Research. 49 p. [report of Fishery Research Laboratory, Bay Bulls, Newfoundland; includes summaries of technical, hydrographic, and biological investigations].

4 Anon. 1937. Report of Fisheries Research Committee. Newfoundland Department of Natural Resources Economic Bull. 4: 47 p.

3 MacPherson, N. L. 1937. Newfoundland cod liver oil. Newfoundland Department of Natural Resources Service Bull. 3: 43 p.

## PUBLICATIONS - 1938

3 Frost, N. 1938. Trout and their conservation. Newfoundland Department of Natural Resources Service Bull. 6: 16 p.

3 Frost, N. 1938. Newfoundland fishes. A popular account of their life histories (Parts I and II). Newfoundland Department of Natural Resources Service Bull. 8: 29 p.

3 Frost, N. 1938. Some fishes of Newfoundland waters (with notes on the distribution of eggs and larvae). Newfoundland Department of Natural Resources Research Bull. 4: 16 p.

3 Frost, N. 1938. The genus Ceratium and its use as an indicator of hydrographic conditions in Newfoundland waters (with an appendix on hydrographic conditions by A. M. Wilson). Newfoundland Department of Natural Resources Research Bull. 5: 15 p.

3 Hampton, W. F. 1938. Pink fish - its cause and prevention. Newfoundland Department of Natural Resources Service Bull. 4: 11 p.

3 Hampton, W. F. 1938. The dogfish and how it can be used. Newfoundland Department of Natural Resources Service Bull. 5: 6 p.

3 Hampton, W. F. 1938. Approved methods of handling codfish for salting and drying. Newfoundland Department of Natural Resources Service Bull. 9: 23 p.

3 Wilson, A. M. 1938. Production and composition of commercial salt. Newfoundland Department of Natural Resources Service Bull. 7: 14 p.

## PUBLICATIONS - 1939

3 Hampton, W. F. 1939. Elementary principles of food preservation. Newfoundland Department of Natural Resources Service Bull. 12: 11 p.

3 Templeman, W. 1939. Investigations into the life history of the lobster (Homarus americanus) on the west coast of Newfoundland, 1938. Newfoundland Department of Natural Resources Research Bull. 7: 52 p.

3 Thompson, H. 1939. The occurrence and biological features of haddock in the Newfoundland area. Newfoundland Department of Natural Resources Research Bull. 6: 31 p.

3 Wilson, A. M. 1939. Fish meal and its uses. Newfoundland Department of Natural Resources Service Bull. 11: 22 p.

## PUBLICATIONS - 1940

3 Frost, N. 1940. A preliminary study of Newfoundland trout. Newfoundland Department of Natural Resources Research Bull. 9: 30 p.

3 Frost, N. 1940. Newfoundland flat-fishes. A popular account of their life histories. Newfoundland Department of Natural Resources Service Bull. 14: 23 p.

3 Hampton, W. F. 1940. A guide to canning practice. Newfoundland Department of Natural Resources Service Bull. 13: 28 p.

3 Templeman, W. 1940. Lobster tagging on the west coast of Newfoundland, 1938. Newfoundland Department of Natural Resources Research Bull. 8: 16 p.

3 Templeman, W. 1940. The life history of the lobster. Newfoundland Department of Natural Resources Service Bull. 15: 42 p.

3 Templeman, W. 1940. The washing of berried lobsters and the enforcement of berried lobster laws. Newfoundland Department of Natural Resources Research Bull. 10: 21 p.

PUBLICATIONS - 1941

3 Templeman, W. 1941. The Newfoundland lobster fishery; an account of statistics, methods and important laws. Newfoundland Department of Natural Resources Research Bull. 11: 42 p.

PUBLICATIONS - 1942

1 Blair, A. A. 1942. Regeneration of the scales of Atlantic salmon. J. Fish. Res. Board Can. 5: 440-447.

PUBLICATIONS - 1943

3 Blair, A. A. 1943. Salmon investigations: 1. Obstructions in Newfoundland and Labrador rivers. Newfoundland Department of Natural Resources Research Bull. 12: 50 p.

3 Blair, A. A. 1943. Salmon investigations: 2. Atlantic salmon of the east coast of Newfoundland and Labrador, 1939. Newfoundland Department of Natural Resources Research Bull. 13: 21 p.

3 Thompson, H. 1943. A biological and economic study of cod (Gadus callarias L.) in the Newfoundland area (including Labrador). Newfoundland Department of Natural Resources Research Bull. 14: 160 p.

PUBLICATIONS - 1944

1 Templeman, W. 1944. Sexual dimorphism in the lobster (Homarus americanus). J. Fish. Res. Board Can. 6: 228-232.

1 Templeman, W. 1944. Abdominal width and sexual maturity of female lobsters on Canadian Atlantic coast. J. Fish. Res. Board Can. 6: 281-290.

3 Templeman, W. 1944. The life-history of the spiny dogfish (Squalus acanthias) and the vitamin A values of dogfish liver oil. Newfoundland Department of Natural Resources Research Bull. 15: 102 p.

PUBLICATIONS - 1945

4 Anon. 1945. Report of the Newfoundland Government Laboratory, p. 7-15. In Annual Report - 1944. Newfoundland Department of Natural Resources, St. John's, Newfoundland.

4 Templeman, W. 1945. Work of Fisheries Laboratory. Newfoundland Government Bulletin 2(5): 1-2.

1 Templeman, W. 1945. Observations on some Newfoundland sea birds. Can. Field-Nat. 59: 136-147.

4 Templeman, W. 1945. A brief history of fisheries research in Newfoundland. Can. Fisherman 32(10): 24, 26, 30, 43.

3 Templeman, W., and S. N. Tibbo. 1945. Lobster investigations in Newfoundland, 1938 to 1941. Newfoundland Department of Natural Resources Research Bull. 16: 98 p.

PUBLICATIONS - 1946

4 Anon. 1946. Report of the Newfoundland Government Laboratory, p. 7-12. In Annual Report - 1945. Newfoundland Department of Natural Resources, St. John's, Newfoundland.

PUBLICATIONS - 1947

4 Anon. 1947. Report of the Newfoundland Government Laboratory, p. 5-13. In Annual Report - 1946. Newfoundland Department of Natural Resources, St. John's, Newfoundland.

1 Templeman, W. 1947. Trout with abnormally long fins. Can. Field-Nat. 61: 142.

PUBLICATIONS - 1948

3 Templeman, W. 1948. The life history of the caplin (Mallotus villosus, O. F. Müller) in Newfoundland waters. Newfoundland Department of Natural Resources Research Bull. 17: 151 p.

3 Templeman, W. 1948. Abnormalities in lobsters. Newfoundland Department of Natural Resources Research Bull. 18: 3-8.

3 Templeman, W. 1948. A possible substitute for the plugging and banding of lobster claws. Newfoundland Department of Natural Resources Research Bull. 18: 9-11.

3 Templeman, W. 1948. Body form and stage identification in the early stages of the American lobster. Newfoundland Department of Natural Resources Research Bull. 18: 12-25.

3 Templeman, W. 1948. Growth per moult in the American lobster. Newfoundland Department of Natural Resources Research Bull. 18: 26-48.

PUBLICATIONS - 1949

4 Anon. 1949. [Edited by W. Templeman] Fisheries Research Board of Canada Annual Report of the Newfoundland Biological Station for 1949 - with investigators' summaries as appendices. 36 p.

PUBLICATIONS - 1950

4 Anon. 1950. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Newfoundland Biological Station for 1950 - with investigators' summaries as appendices. 62 p.

## PUBLICATIONS - 1951

4 Anon. 1951. New rosefish grounds in Atlantic. Fisheries Department Trade News 3(7): 13-15 (from report by W. Templeman).

4 Anon. 1951. Results of long-lining tests. Trade News 4(6): 6, 16 (from report by W. Templeman).

3 Sergeant, D. E. 1951. Whales, Appendix A, p. 48-53. In Fish. Res. Board Can. MS Rep. Biol. Sta. 430.

3 Templeman, W. 1951. Newfoundland commercial fish and invertebrates. An account prepared for the Newfoundland Fisheries Development Committee. Fish. Res. Board Can. MS Rep. Biol. Sta. 430: 72 p.

3 Templeman, W. 1951. Long-lining at Bonavista, 1950-51, Appendix D, p. 61-72. In Fish. Res. Board Can. MS Rep. Biol. Sta. 430.

3 Templeman, W. 1951. Some migrations of cod on the Atlantic Coast of Canada. Fish. Res. Board Can. MS Rep. Biol. Sta. 424: 18 p. (also ICNAF Meeting Doc. 52/5E, Ser. No. 45G).

3 Templeman, W. 1951. The Bonavista long-lining experiment 1951. Fish. Res. Board Can. MS Rep. Biol. Sta. 444: 32 p.

## PUBLICATIONS - 1952

4 Anon. 1952. (Edited by W. Templeman) Fisheries Research Board of Canada Report of the Newfoundland Fisheries Research Station for 1951 - with investigators' summaries as appendices. 92 p.

3 Fleming, A. M. 1952. A study of the age and growth of the cod (Gadus callarias L.) in the Newfoundland area. M.A. thesis, Univ. Toronto, Toronto, Ont. 119 p.

3 Sergeant, D. E. 1952. Ecological relationship of the guillemots Uria aalge and Uria lomvia, p. 578-587. Proc. Xth Int. Ornithol. Congr., Uppsala, June 1950.

3 Sergeant, D. E. 1952. Little auks in Britain, 1948 to 1951. Br. Birds 45: 122-133.

3 Templeman, W. 1952. Excerpts from Report of the Newfoundland Biological Station for 1949. ICNAF Meeting Doc. 52/5E, Ser. No. 45D.

3 Templeman, W. 1952. Excerpts from Report of the Newfoundland Biological Station for 1950. ICNAF Meeting Doc. 52/5E, Ser. No. 45E.

3 Templeman, W. 1952. Some migrations of cod on the Atlantic coast of Canada. ICNAF Meeting Doc. 52/5E, Ser. No. 45F.

3 Templeman, W. 1952. Excerpts from Report of the Newfoundland Fisheries Research Station for 1951. ICNAF Meeting Doc. 52/5E, Ser. No. 45G.

3 Templeman, W. 1952. Canadian groundfish research in Subareas 3 and 2. ICNAF Meeting Doc. 52/11, Ser. No. 53.

## PUBLICATIONS - 1953

4 Anon. 1953. (Edited by W. Templeman) Fisheries Research Board of Canada Report of the Newfoundland Fisheries Research Station for 1952 - with investigators' summaries as appendices. 84 p.

3 Fleming, A. M. 1953. Canadian fishery in Subarea 2 in 1952. ICNAF Meeting Doc. 53/45, Ser. No. 113C.

4 Sergeant, D. E. 1953. The pothead whale industry of Newfoundland. Trade News 5(9): 3-4.

4 Sergeant, D. E. 1953. Whaling in Newfoundland and Labrador waters. Norsk Hvalfangst-Tidende (Norwegian Whaling Gazette) 12: 687-695.

3 Sergeant, D. E. 1953. The effects and mode of action of external factors regulating reproductive cycles and spawning in teleost fish. Ph.D. thesis, Univ. Cambridge, Cambridge, U.K. 197 p.

3 Templeman, W. 1953. Knowledge of divisions of stocks of cod, haddock, redfish and American plaice in Subareas 3 and 2 of the Northwest Atlantic Convention Area. ICNAF Annu. Proc. 3: 62-66 (also ICNAF Meeting Doc. 53/33, Ser. No. 104).

3 Templeman, W., and A. M. Fleming. 1953. Proposed revision of division of Subareas 2 and 3. ICNAF Meeting Doc. 53/18A, Ser. No. 90.

3 Templeman, W., and A. M. Fleming. 1953. Long-term changes in hydrographic conditions and corresponding changes in the abundance of marine animals. ICNAF Annu. Proc. 3: 79-86 (also ICNAF Meeting Doc. 53/25, Ser. No. 971.

3 Templeman, W., A.W.H. Needler, and W. R. Martin. 1953. Summary of Canadian groundfish research in the Convention Area during 1952. ICNAF Annu. Proc. 3: 25-27 (also ICNAF Meeting Doc. 53/23, Ser. No. 951.

PUBLICATIONS - 1954

4 Andrews, G. L. 1954. Capelin analyses. Fish. Res. Board Can. Atl. Prog. Rep. 59: 6-7.

4 Anon. 1954. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Newfoundland Fisheries Research Station for 1953 - with investigators' summaries as appendices. 115 p.

4 Anon. 1954. [Compiled by A. M. Fleming] Summary report of the landings of groundfish in Newfoundland by all types of fishing boats during 1953. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 1: 9 p.

3 Bailey, W. B., W. Templeman, and R. P. Hunt. 1954. The horizontal distribution of temperatures and salinities off the Canadian Atlantic Coast. Fish. Res. Board Can. MS Rep. Biol. Sta. 584: 23 p.

3 Fisher, H. D., and D. E. Sergeant. 1954. A review of the harp seal problem. Fish. Res. Board Can. MS Rep. Biol. Sta. 591: 41 p.

1 Fisher, H. D., and D. E. Sergeant. 1954. A record of the white whale in the Bay of Fundy. Can. Field-Nat. 68: 138.

3 Fleming, A. M. 1954. Newfoundland statistics of groundfish landings, fishing effort and yield per unit of fishing effort from Subareas 2 and 3 of the Northwest Atlantic Convention Area. In ICNAF Stat. Bull. 2.

1 Squires, H. J. 1954. Records of marine turtles in the Newfoundland area. Copeia 1: 68.

1 Templeman, W. 1954. Migrations of spiny dogfish tagged in Newfoundland waters. J. Fish. Res. Board Can. 11: 351-354.

4 Templeman, W. 1954. Lobsters eaten by sea-fleas. Fish. Res. Board Can. Atl. Prog. Rep. 60: 14-15.

4 Templeman, W. 1954. Section sampling of salt codfish for water content. Fish. Res. Board Can. Atl. Prog. Rep. 60: 15-17.

1 Templeman, W., and A. M. Fleming. 1954. European ling - first record from North American waters. J. Fish. Res. Board Can. 11: 11-13.

3 Templeman, W., and W. R. Martin. 1954. Summary of Canadian groundfish research in the Convention Area during 1953. ICNAF Annu. Proc. 4: 23-27 (also ICNAF Meeting Doc. 54/14, Ser. No. 1841.

4 Templeman, W., and T. K. Pitt. 1954. Bruised condition of the American plaice. Fish. Res. Board Can. Atl. Prog. Rep. 59: 3-6.

PUBLICATIONS - 1955

4 Anon. 1955. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Newfoundland Fisheries Research Station for 1954 - with investigators' summaries as appendices. 75 p.

4 Anon. 1955. [Compiled by A. M. Fleming] 1. Summary report of groundfish investigations for 1954. 2. Landings and fishing effort of boats landing their catches in Newfoundland in 1954. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 2: 24 p.

3 Fleming, A. M. 1955. Canada (Newfoundland) statistics of groundfish landings, fishing effort and yield per unit of fishing effort from Subareas 2 and 3 and Division 4R of the ICNAF Convention Area in 1953. In ICNAF Stat. Bull. 3.

4 MacPherson, H. D. 1955. The Valleyfield-Badgers Quay commercial long-lining experiment. Fish. Res. Board Can. Atl. Prog. Rep. 63: 19-23.

4 Murray, A. R. 1955. Summary of biological investigations of Clements Pond. Report submitted to Sir Leonard Outerbridge, Lieutenant-Governor, Province of Newfoundland. 6 p.

4 Squires, H. J. 1955. Fishery research in Newfoundland. Newfoundland Quarterly 54(4): 13-15, 17.

3 Templeman, W. 1955. Groundfish stocks of the western North Atlantic, p. 454-476. Trans. Twentieth N. Am. Wildl. Conf. [also ICNAF Meeting Doc. 55/15, Ser. No. 282].

4 Templeman, W. 1955. Cod landings from the Northwest Atlantic, 1931-53. Fish. Res. Board Can. Atl. Prog. Rep. 62: 4-7.

4 Templeman, W. 1955. Present and future prospects of fisheries in the Newfoundland area [MS used in submission to Royal Commission on Canada's economic future].

3 Templeman, W., and W. R. Martin. 1955. Canadian researches, 1954. ICNAF Annu. Proc. 5: 19-27 [also ICNAF Meeting Doc. 55/16, Ser. No. 283].

1 Tuck, L. M., and H. J. Squires. 1955. Food and feeding habits of Brunnich's murre (Uria lomvia lomvia) on Akpatok Island. J. Fish. Res. Board Can. 12: 781-792.

1 Vavasour, G. R., and A. A. Blair. 1955. Pollution survey of Humber Arm and Exploits River. J. Fish. Res. Board Can. 12: 682-697.

## PUBLICATIONS - 1956

1 *Andrews, C. W., and E. Lear. 1956. The biology of Arctic char (Salvelinus alpinus L.) in northern Labrador. J. Fish. Res. Board Can. 13: 843-860.

4 Anon. 1956. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1955 - with investigators' summaries as appendices. 70 p.

4 Anon. 1956. [Compiled by A. M. Fleming and M. E. Prouse] 1. Summary report of groundfish investigations for 1955. 2. Landings and fishing effort of boats landing their catches in Newfoundland in 1955. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 3: 58 p.

1 Blair, A. A. 1956. Atlantic salmon tagged in east coast Newfoundland waters at Bonavista. J. Fish. Res. Board Can. 13: 219-232.

3 Fleming, A. M., and M. E. Prouse. 1956. Canada (Newfoundland) statistics of groundfish landings, fishing effort and yield per unit of fishing effort from Subareas 2 and 3 and Subdivision 4R of the ICNAF Convention Area, 1954. In ICNAF Stat. Bull. 4.

4 MacPherson, H. D. 1956. Experiments in Newfoundland result in profitable longlining for cod. Can. Fisherman 43(3): 14, 16.

4 Murray, A. R. 1956. Fertilization and management of Butler's and Murray's Ponds. Report submitted to Newfoundland Game Fish Protection Society Limited. 27 p.

3 Pitt, T. K. 1956. Some characteristics of the capelin (Mallotus villosus O. F. Müller) in Newfoundland waters with special reference to the Grand Bank populations. M.A. thesis, Univ. Toronto, Toronto, Ont. 128 p.

1 Pitt, T. K., E. J. Garside, and R. L. Hepburn. 1956. Temperature selection of the carp (Cyprinus carpio Linn.). Can. J. Zool. 34: 555-557.

3 Squires, H. J. 1956. Decapod Crustacea of the CALANUS expeditions in Ungava Bay, 1947-50. M.Sc. thesis, McGill Univ., Montreal, P.Q.

2 Stewart, T. N. 1956. Danish-seining explorations in Newfoundland and Cape Breton areas. Bull. Fish. Res. Board Can. 108: 26 p.

1 Templeman, W., and G. L. Andrews. 1956. Jellied condition in the American plaice Hippoglossoides platessoides (Fabricius). J. Fish. Res. Board Can. 13: 147-182.

2 Templeman, W., and A. M. Fleming. 1956. The Bonavista longlining experiment, 1950-53. Bull. Fish. Res. Board Can. 109: vii + 55 p.

3 Templeman, W., and W. R. Martin. 1956. Canadian researches, 1955. ICNAF Annu. Proc. 6: 21-27 [also ICNAF Meeting Doc. 56/17, Ser. No. 376].

1 Templeman, W., and H. J. Squires. 1956. Relationship of otolith lengths and weights in the haddock, Melanogrammus aeglefinus (L.) to the rate of growth of the fish. J. Fish. Res. Board Can. 13: 467-487.

PUBLICATIONS - 1957

4 Anon. 1957. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1956-57 - with investigators' summaries as appendices. 73 p.

4 Anon. 1957. Squid and pilot whales. Trade News 9(11): 11 [based on material from Board's Arctic Unit, Montreal, and Biological Station, St. John's, Nfld.].

1 Blair, A. A. 1957. Salmon tagging at Francis Harbour Bight, Labrador. J. Fish. Res. Board Can. 14: 135-140.

1 Blair, A. A. 1957. Salmon tagging at Cape Charles, Labrador. J. Fish. Res. Board Can. 14: 141-144.

1 Blair, A. A. 1957. Counting fence of netting. Trans. Am. Fish. Soc. 86: 199-207.

4 Fleming, A. M., and M. E. Prouse. 1957. I. Summary reports of groundfish investigations for 1956. II. Groundfish landings in Newfoundland, 1956. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 4: 25 p.

3 Prouse, M. E., and A. M. Fleming. 1957. Newfoundland statistics of groundfish landings, fishing effort and yield per unit of fishing effort from Subareas 2 and 3 and Subdivision 4R of the Northwest Atlantic Convention Area, 1956. In ICNAF Stat. Bull. 5.

4 Sandeman, E. J. 1957. Redfish grow slowly. Fish. Res. Board Can. Atl. Prog. Rep. 67: 26-28.

1 Squires, H. J. 1957. Squid, Illex illecebrosus (LeSueur), in the Newfoundland fishing area. J. Fish. Res. Board Can. 14: 693-728.

4 Squires, H. J. 1957. Cod eggs and herring larvae in late September an indication of fall spawning in the Gulf of St. Lawrence. Fish. Res. Board Can. Atl. Prog. Rep. 67: 31-33.

1 Squires, H. J. 1957. Decapod Crustacea of the CALANUS Expeditions in Ungava Bay, 1947 to 1950. Can. J. Zool. 35: 463-494.

4 Templeman, W. 1957. Redfish exploration north of Flemish Cap. Fish. Res. Board Can. Atl. Prog. Rep. 67: 14-18.

3 Templeman, W., and W. R. Martin. 1957. Canadian researches, 1956. ICNAF Annu. Proc. 7: 21-27 [also ICNAF Meeting Doc. 57/8, Ser. No. 446].

4 Templeman, W., and E. J. Sandeman. 1957. Two varieties of redfish in the Newfoundland area. Fish. Res. Board Can. Atl. Prog. Rep. 66: 20-23.

1 Templeman, W., H. J. Squires, and A. M. Fleming. 1957. Nematodes in the fillets of cod and other fishes in Newfoundland and neighbouring areas. J. Fish. Res. Board Can. 14: 831-897.

PUBLICATIONS - 1958

4 Anon. 1958. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1957-58 - with investigators' summaries as appendices. 89 p.

1 Blair, A. A. 1958. Back-pack fish shocker. Can. Fish Cult. 23: 33-37.

3 Clark, J. R., F. D. McCracken, and W. Templeman. 1958. Summary of gear selection information for the Commission Area. ICNAF Annu. Proc. 8: 83-89 [also ICNAF Meeting Doc. 58/33, Ser. No. 559].

4 Fleming, A. M. 1958. The commercial longlining experiment, St. Anthony, Newfoundland, 1955. Fish. Res. Board Can. Atl. Prog. Rep. 68: 9-14.

3 Fleming, A. M. 1958. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area in 1956 by Divisions, months, and gears. In ICNAF Stat. Bull. 6.

4 Fleming, A. M. 1958. Differentiation of cod groups in the Newfoundland and Labrador region [Abstract]. ICNAF Spec. Publ. 1: 331.

4 Fleming, A. M., and M. E. Prouse. 1958. Summary report on fishery investigations and groundfish landings in Newfoundland during 1957. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 5: 41 p.

3 Fleming, A. M., and M. E. Prouse. 1958. Canada (Newfoundland) length frequencies, cod and haddock, commercial samples, 1955 and 1956. In ICNAF Sampl. Yearb. 1.

4 Kohler, A. C., W. Templeman, J. R. Clark, and A. C. Jensen. 1958. Haddock scale-otolith comparisons [Abstract]. ICNAF Spec. Publ. 1: 199.

4 Murray, A. R. 1958. Preliminary biology of Atlantic salmon of the Little Codroy River, Newfoundland. Fish. Res. Board Can. Atl. Prog. Rep. 68: 20-27.

4 Murray, A. R. 1958. Survival and utilization of Atlantic salmon of the Little Codroy River, Newfoundland. Fish. Res. Board Can. Atl. Prog. Rep. 70: 16-22.

1 Murray, A. R. 1958. A direct-current electrofishing apparatus using separate excitation. Can. Fish Cult. 23: 27-32.

1 Pitt, T. K. 1958. Distribution, spawning and racial studies of the capelin, Mallotus villosus (Müller), in the offshore Newfoundland area. J. Fish. Res. Board Can. 15: 275-293.

1 Pitt, T. K. 1958. Age and growth of the capelin, Mallotus villosus (Müller), from Newfoundland and Grand Bank areas. J. Fish. Res. Board Can. 15: 295-311.

4 Sandeman, E. J. 1958. Growth of young redfish [Abstract]. ICNAF Spec. Publ. 1: 227.

3 Squires, H. J. 1958. Exploratory fishing for giant scallop, west and southwest coasts of Newfoundland. Fish. Res. Board Can. MS Rep. Biol. Sta. 648: 19 p.

4 Templeman, W. 1958. How cod spawn - Nielsen's observations. Fish. Res. Board Can. Atl. Prog. Rep. 68: 15-17.

4 Templeman, W. 1958. Lobsters eaten by sea-fleas. A further note. Fish. Res. Board Can. Atl. Prog. Rep. 69: 16-17.

4 Templeman, W. 1958. Lath-spacing in lobster traps. Fish. Res. Board Can. Atl. Prog. Rep. 69: 22-28.

4 Templeman, W. 1958. Distribution of the inshore catch of cod in Newfoundland and Labrador waters in the years 1947 to 1949. Fish. Res. Board Can. Atl. Prog. Rep. 70: 3-9.

4 Templeman, W. 1958. Grand Bank tagged dogfish moves to Iceland. Fish. Res. Board Can. Atl. Prog. Rep. 70: 28-30.

1 Templeman, W., and A. M. Fleming. 1958. Round haddock landings in Newfoundland: quantity and quality relative to gutted haddock. J. Fish. Res. Board Can. 15: 517-527.

1 Templeman, W., and V. M. Hodder. 1958. Variation with fish length, sex, stage of sexual maturity, and season in the appearance and volume of the drumming muscles of the swim-bladder in the haddock, Melanogrammus aeglefinus (L.). J. Fish. Res. Board Can. 15: 355-390.

3 Templeman, W., and W. R. Martin. 1958. Canadian research report, 1957. ICNAF Annu. Proc. 8: 19-26 [also ICNAF Meeting Doc. 58/5, Ser. No. 530].

1 Templeman, W., and E. J. Sandeman. 1958. Red flesh in redfish, Sebastes marinus (L.). J. Fish. Res. Board Can. 15: 695-700.

## PUBLICATIONS - 1959

4 Anon. 1959. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland, for 1958-1959 - with investigators' summaries as appendices. 78 p.

4 Fleming, A. M. 1959. Summary report on fishery investigations and groundfish landings in Newfoundland during 1958. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 6: 27 p.

3 Fleming, A. M. 1959. The longline fishery at Bonavista, Newfoundland, 1952-58. ICNAF Meeting Doc. 59/30, Ser. No. 629. 3 p.

3 Fleming, A. M. 1959. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area in 1957 by Divisions, months, and gears. In ICNAF Stat. Bull. 7.

3 Fleming, A. M., and S. J. Olsen. 1959. Size and age composition of cod from the fishery on the southwest coast of Newfoundland during 1957. ICNAF Meeting Doc. 59/32, Ser. No. 631. 5 p.

3 Fleming, A. M., and M. E. Prouse. 1959. Canada (Newfoundland) length frequencies, cod and haddock, commercial samples, 1957. In ICNAF Sampl. Yearb. 2.

3 May, A. W. 1959. Cod investigations in Subarea 2 (Labrador), 1950 to 1958. ICNAF Annu. Proc. 9: 103-105 [also ICNAF Meeting Doc. 59/31, Ser. No. 630].

1 Olsen, S. J. 1959. Mesh selection in herring gillnets. J. Fish. Res. Board Can. 3: 339-349.

4 Squires, H. J. 1959. Squid inshore in Newfoundland and on the Grand Bank, 1953 to 1958. Fish. Res. Board Can. Atl. Prog. Rep. 72: 23-26.

2 Templeman, W. 1959. Redfish distribution in the North Atlantic. Bull. Fish. Res. Board Can. 120: viii + 173 p.

3 Templeman, W., and W. R. Martin. 1959. Canadian research report, 1958. ICNAF Annu. Proc. 9: 20-30 [also ICNAF Meeting Doc. 59/7, Ser. No. 606].

1 Templeman, W., and E. J. Sandeman. 1959. Variations in caudal pigmentation in late-stage pre-extrusion larvae from marinus- and mentella-type female redfish from the Newfoundland area. J. Fish. Res. Board Can. 16: 765-789.

## PUBLICATIONS - 1960

4 Anon. 1960. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1959-1960 - with investigators' summaries as appendices. 97 p.

1 Fleming, A. M. 1960. Age, growth and sexual maturity of cod (Gadus morhua L.) in the Newfoundland area, 1947-1950. J. Fish. Res. Board Can. 17: 775-809.

4 Fleming, A. M. 1960. Summary report on fishery investigations and groundfish landings in Newfoundland during 1959. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 7: 36 p.

3 Fleming, A. M. 1960. Canadian (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1958 by Divisions, months and gears. In ICNAF Stat. Bull. 8.

3 Fleming, A. M. 1960. Canada (Newfoundland) length frequencies of commercial samples, cod and haddock, 1958; of witch flounder, 1955-1957; of redfish and American plaice, 1955-1958. In ICNAF Sampl. Yearb. 3.

1 Olsen, S. 1960. Observations on sound scatterers in Newfoundland waters. J. Fish. Res. Board Can. 17: 211-219.

3 Templeman, W., and W. R. Martin. 1960. Canadian research report, 1959. ICNAF Annu. Proc. 10: 19-31 [also ICNAF Meeting Doc. 60/11, Ser. No. 729].

1 Templeman, W., and H. J. Squires. 1960. Incidence and distribution of infestation by Sphyrion lumpi (Krøyer) on the redfish, Sebastes marinus (L.), of the western North Atlantic. J. Fish. Res. Board Can. 17: 9-31.

## PUBLICATIONS - 1961

4 Anon. 1961. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1960-1961 - with investigators' summaries as appendices. 97 p.

4 Anon. 1961. Summary report on fishery investigations and groundfish landings in Newfoundland during 1960. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 8: 20 p.

3 Fleming, A. M. 1961. Canadian (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1959 by Divisions, months and gears. In ICNAF Stat. Bull. 9.

3 Fleming, A. M. 1961. Canada (Newfoundland) length frequencies of cod, haddock, redfish and American plaice, commercial samples, 1959. In ICNAF Sampl. Yearb. 4.

1 Olsen, S. 1961. Contribution to the biology of herring (Clupea harengus L.) in Newfoundland waters. J. Fish. Res. Board Can. 18: 31-46.

3 Rees, E.I.S. 1961. Notes on the distribution of the fulmar in the Northwest Atlantic. Sea Swallow 14: 51-53.

3 Rees, E.I.S. 1961. Notes on the food of the greater shearwater. Sea Swallow 14: 54-55.

3 Sandeman, E. J. 1961. A contribution to the problem of the age determination and growth-rate in Sebastes. ICNAF Spec. Publ. 3: 276-284 [also Rapp. P.-V. Reun. Cons. Int. Explor. Mer 150: 276-284].

3 Sandeman, E. J., and A. W. May. 1961. Preliminary results of experiments on the measurement of meshes with different gauges and by different operators. ICNAF Redb. 1961: 123-144 [also ICNAF Meeting Doc. 61/35, Ser. No. 895].

2 Squires, H. J. 1961. Shrimp survey in the Newfoundland fishing area, 1957 and 1958. Bull. Fish. Res. Board Can. 129: vii + 29 p.

3 Templeman, W. 1961. Redfish distribution off Baffin Island, Northern Labrador, and in Ungava Bay in August-September 1959. ICNAF Spec. Publ. 3: 157-162 [also Rapp. P.-V. Reun. Cons. Int. Explor. Mer 150: 157-162].

3 Templeman, W. 1961. Redfish distribution. ICNAF Spec. Publ. 3: 120-121 [also Rapp. P.-V. Reun. Cons. Int. Explor. Mer 150: 120-121].

4 Templeman, W. 1961. Redfish distribution in the North Atlantic [Abstract]. ICNAF Spec. Publ. 3: 154-156 [also Rapp. P.-V. Reun. Cons. Int. Explor. Mer 150: 154-156].

3 Templeman, W. 1961. Summary of research work carried out in Subareas 2 and 3 in 1960. ICNAF Redb. 1961: 103-107 [also ICNAF Meeting Doc. 61/43, Ser. No. 910, and ICNAF Meeting Doc. 61/44, Ser. No. 911].

3 Templeman, W., and W. R. Martin. 1961. Canadian research report, 1960. ICNAF Annu. Proc. 11: 23-37 [also ICNAF Meeting Doc. 61/10, Ser. No. 806].

3 Templeman, W., and T. K. Pitt. 1961. Vertebral numbers of redfish, Sebastes marinus (L.), in the North-west Atlantic, 1947-1954. ICNAF Spec. Publ. 3: 56-89 [also Rapp. P.-V. Réun. Cons. int. Explor. Mer 150: 56-89].

4 Templeman, W., and E. J. Sandeman. 1961. Variations in caudal pigmentation in late-stage pre-extrusion larvae from marinus- and mentella-type female redfish from the Newfoundland area [Abstract]. ICNAF Spec. Publ. 3: 241 [also Rapp. P.-V. Réun. Cons. int. Explor. Mer 150: 241].

4 Templeman, W., and H. J. Squires. 1961. Incidence and distribution of infestation by Sphyrion lumpi (Krøyer) on the redfish, Sebastes marinus (L.) of the western North Atlantic, 1949-1955 [Abstract]. ICNAF Spec. Publ. 3: 119 [also Rapp. P.-V. Réun. Cons. int. Explor. Mer 150: 119].

4 Williamson, G. R. 1961. Two kinds of minke whale in the Antarctic. Norsk Hvalfangst-Tidende (Norwegian Whaling Gazette) 4: 133-141.

4 Williamson, G. R. 1961. Winter sighting of a humpback suckling its calf on the Grand Bank of Newfoundland. Norsk Hvalfangst-Tidende (Norwegian Whaling Gazette) 8: 335-341.

## PUBLICATIONS - 1962

4 Anon. 1962. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1961-1962 - with investigators' summaries as appendices. 116 p.

4 Anon. 1962. Summary report on fishery investigations and groundfish landings in Newfoundland during 1961. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 9: 27 p.

3 Beverton, R.J.H., and V. M. Hodder [ed.]. 1962. Report of working group of scientists on fishery assessment in relation to regulation problems. ICNAF Annu. Proc. 11 (Supplement): 81 p.

3 Fleming, A. M. 1962. Canadian (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1960 by Divisions, months and gears. In ICNAF Stat. Bull. 10.

3 Fleming, A. M., A. W. May, W. N. Batten, and M. O'Hanlon. 1962. Canada (Newfoundland) length frequencies of cod, haddock, redfish and American plaice (ICNAF Subareas 3 and 4), commercial samples, 1960. In ICNAF Sampl. Yearb. 5(I).

3 Fleming, A. M., and M. O'Hanlon. 1962. Canada (Newfoundland) length frequencies of redfish and American plaice (ICNAF Subareas 3 and 4), commercial samples, 1960. In ICNAF Sampl. Yearb. 5(II).

1 Gulland, J. A., and G. R. Williamson. 1962. Transatlantic journey of a tagged cod. Nature 195: 921.

3 Hodder, V. M. 1962. Assessments of the effects of fishing and of increasing the mesh size of trawls on the major commercial fisheries of the Newfoundland area (ICNAF Subarea 3). M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 151 p.

3 May, A. W. 1962. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2), commercial and research samples, 1959 and 1960. In ICNAF Sampl. Yearb. 5(I).

3 May, A. W., and V. M. Hodder. 1962. Comparisons of ICNAF and Westhoff gauges under field conditions. ICNAF Redb. 1962(III): 141-153 [also ICNAF Meeting Doc. 62/46, Ser. No. 988].

3 Sandeman, E. J., and A. W. May. 1962. Comparative effects of gauge pressure on mesh size measurements of manila nets. ICNAF Redb. 1962(III): 154-180 [also ICNAF Meeting Doc. 62/49, Ser. No. 991].

2 Squires, H. J. 1962. Giant scallops in Newfoundland coastal waters. Bull. Fish. Res. Board Can. 135: ix + 29 p.

1 Squires, H. J. 1962. Decapod Crustacea of the CALANUS Expeditions in Frobisher Bay, Baffin Island, 1951. J. Fish. Res. Board Can. 19: 677-686.

3 Templeman, W. 1962. Summary of research work in Subareas 2 and 3 in 1961. ICNAF Annu. Proc. 12: 23-30 [also ICNAF Meeting Doc. 62/81, Ser. No. 1025, and ICNAF Meeting Doc. 62/82, Ser. No. 1026].

3 Templeman, W. 1962. Divisions of cod stocks in the Northwest Atlantic. ICNAF Redb. 1962(III): 79-123 [also ICNAF Meeting Doc. 62/47, Ser. No. 989].

1 Templeman, W. 1962. Record of the oceanic puffer, Lagocephalus lagocephalus (L.), family Tetraodontidae, from Newfoundland. J. Fish. Res. Board Can. 19: 811-814.

1 Templeman, W., and A. M. Fleming. 1962. Cod tagging in the Newfoundland area during 1947 and 1948. J. Fish. Res. Board Can. 19: 445-487.

3 Templeman, W., W. R. Martin, L. M. Lauzier, and A. Marcotte. 1962. Canadian research report, 1961. ICNAF Redb. 1962(II): 3-32 [also ICNAF Meeting Doc. 62/16, Ser. No. 954].

1 Templeman, W., and H. J. Squires. 1962. Record of the blue ling, Molva byrkelange (Walbaum), from the Newfoundland area. J. Fish. Res. Board Can. 19: 891-894.

4 Williamson, G. R. 1962. An account of the bluefin tuna in Newfoundland waters, with some references to the tuna fishes in general. Govt. Nfld., Div. Tour. Dev., Nfld. Tour. Dev. Office. 23 p.

## PUBLICATIONS - 1963

4 Anon. 1963. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1962-63 - with investigators' summaries as appendices. 75 p.

4 Anon. 1963. Fishery investigations and groundfish landings - Newfoundland 1962. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 10: 26 p.

3 Dickie, L. M., and W. Templeman. 1963. Estimation of mixing, dispersal and migration; stock identification. ICNAF Spec. Publ. 4: 12.

3 Fleming, A. M. 1963. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1961 by Divisions, months and gears. In ICNAF Stat. Bull. 11.

3 Fleming, A. M. 1963. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1962 by Divisions, months and gears. In ICNAF Stat. Bull. 11.

3 Fleming, A. M. 1963. Discarding of fish by the Canada (Nfld.) commercial fishery in 1962. ICNAF Meeting Doc. 63/70, Ser. No. 1141. 3 p.

3 Fleming, A. M., and M. O'Hanlon. 1963. Canada (Newfoundland) length frequencies of cod, haddock, redfish and American plaice (ICNAF Subareas 3 and 4), commercial samples, 1961. In ICNAF Sampl. Yearb. 6(1).

1 Hodder, V. M. 1963. Fecundity of Grand Bank haddock. J. Fish. Res. Board Can. 20: 1465-1487.

3 Hodder, V. M. 1963. Mesh selection of haddock in Divisions 3N and 3O. ICNAF Meeting Doc. 63/53, Ser. No. 1124. 4 p.

3 Hodder, V. M. 1963. Comparison of mesh measurements with ICNAF and Westhoff gauges. ICNAF Meeting Doc. 63/73, Ser. No. 1144. 2 p.

2 McAllister, D. E., and E.I.S. Rees. 1963. A revision of the eelpout genus Melanostigma with a new genus and with comments on Maynea. Bull. Nat. Mus. Can. 199: 109 p.

1 Pinhorn, A. T., and C. W. Andrews. 1963. Effect of photoperiods on the reactions of juvenile Atlantic salmon (Salmo salar L.) to light stimuli. J. Fish. Res. Board Can. 20: 1245-1266.

1 Pitt, T. K. 1963. Vertebral numbers of American plaice, Hippoglossoides platessoides (Fabricius), in the Northwest Atlantic. J. Fish. Res. Board Can. 20: 1159-1161.

1 Rees, E.I.S. 1963. Marine birds in the Gulf of St. Lawrence and Strait of Belle Isle during November. Can. Field-Nat. 77: 98-107.

1 Rees, E.I.S. 1963. The batfish, Dibranchus atlanticus Peters, on the Canadian Atlantic slopes. J. Fish. Res. Board Can. 20: 1513-1517.

1 Rees, E.I.S., and M. R. Clarke. 1963. First records of Tetronychoteuthis dussumieri (d'Orbigny) (Cephalopoda; Onychoteuthidae) from the Northwest Atlantic. J. Fish. Res. Board Can. 20: 853-854.

3 Sandeman, E. J., and E.I.S. Rees. 1963. Some notes on the tagging of redfish, Sebastes marinus (L.), from deep water. ICNAF Spec. Publ. 4: 300-305.

1 Templeman, W. 1963. Additional note on the oceanic puffer, Lagocephalus lagocephalus (L.). J. Fish. Res. Board Can. 20: 253.

3 Templeman, W. 1963. Report on researches carried out and the status of the fisheries in Subareas 2 and 3. ICNAF Annu. Proc. 13: 29-35 [also ICNAF Meeting Doc. 63/76, Ser. No. 1148, and ICNAF Meeting Doc. 63/77, Ser. No. 1149].

3 Templeman, W. 1963. Comparison of returns from different tags and methods of attachment used in cod tagging in the Newfoundland area, 1954 and 1955. ICNAF Spec. Publ. 4: 272-287.

3 Templeman, W. 1963. Otter-trawl covered codend and alternate haul mesh-selection experiments on redfish, haddock, cod, American plaice and witch flounder: girth measurements of haddock, cod and redfish and meshing of redfish in the Newfoundland area. ICNAF Spec. Publ. 5: 201-217.

2 Templeman, W. 1963. Distribution of sharks in the Canadian Atlantic (with special reference to Newfoundland waters). Bull. Fish. Res. Board Can. 140: vii + 77 p. [Edition française 1966 Répartitions des requins dans l'atlantique canadien (et plus particulièrement dans les eaux de Terre-Neuve). 83 p.].

2 Templeman, W., and A. M. Fleming. 1963. Longlining experiments for cod off the east coast of Newfoundland and southern Labrador, 1950-1955. Bull. Fish. Res. Board Can. 141: viii + 65 p.

3 Templeman, W., and A. M. Fleming. 1963. Distribution of Lernaeocera branchialis (L.) on cod as an indicator of cod movements in the Newfoundland area. ICNAF Spec. Publ. 4: 318-322.

3 Templeman, W., W. R. Martin, L. M. Lauzier, N. J. Campbell, and A. Marcotte. 1963. Canadian research report, 1962, Part A, Subareas 2 and 3. ICNAF Redb. 1963(II): 3-27 [also ICNAF Meeting Doc. 63/13, Ser. No. 1080].

3 Templeman, W., and T. K. Pitt. 1963. Comparison of returns from different tags and tagging methods for cod tagged in the inshore area, St. John's and Fogo, Newfoundland, 1950. ICNAF Spec. Publ. 4: 294-299.

1 Templeman, W., and H. J. Squires. 1963. Three records of the black scabbardfish, Aphanopus carbo Lowe, from the Canadian region of the western Atlantic. J. Fish. Res. Board Can. 20: 275-278.

1 Williamson, G. R. 1963. Common porpoise from the stomach of a Greenland shark. J. Fish. Res. Board Can. 20: 1085-1086.

4 Williamson, G. R. 1963. Newfoundland barachois yields two giant trout. Atl. Salmon J. (August 1963) 2: 18-20.

4 Williamson, G. R. 1963. The Soviet fishery in the ICNAF area. Can. Fisherman 50(7): 17-22, 36.

4 Williamson, G. R. 1963. The Soviet fishery. Atl. Advocate 54(2): 34-36, 39.

## PUBLICATIONS - 1964

4 Anon. 1964. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1963-64 - with investigators' summaries as appendices. 88 p.

4 Anon. 1964. [Edited by A. M. Fleming] Fishery investigations and groundfish landings - Newfoundland, 1963. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 11: 42 p.

4 Anon. 1964. Pink salmon transplant. Trade News 16(7): 16.

3 Fleming, A. M. 1964. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1962 by Divisions, months and gears. In ICNAF Stat. Bull. 12.

3 Fleming, A. M. 1964. Discarding of fish in the commercial fishery for Canada (Nfld.) in 1963. ICNAF Meeting Doc. 64/60, Ser. No. 1356. 2 p.

3 Fleming, A. M., A. W. May, and C. J. Elms. 1964. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, (ICNAF Subareas 3 and 4) commercial samples, 1962. In ICNAF Sampl. Yearb. 7.

4 Hodder, V. M. 1964. Prospects for the Newfoundland squid fishery in 1964. Trade News 17(1): 16-18.

3 Hodder, V. M. 1964. Assessments of the effects of fishing and of increases in the mesh size of trawls on the major commercial fisheries of the Newfoundland area (ICNAF Subarea 3). Fish. Res. Board Can. MS Rep. Biol. Sta. 801: 116 p.

3 Hodder, V. M. 1964. Trends in the cod fishery off the east coast of Newfoundland and Labrador (ICNAF Subarea 2 and Divisions 3K and 3L). ICNAF Meeting Doc. 64/76, Ser. No. 1372. 17 p. [see ICNAF Res. Bull. 2: 31-41].

1 Hodder, V. M., and A. W. May. 1964. The effect of catch size on the selectivity of otter trawls. ICNAF Res. Bull. 1: 28-35.

3 Hodder, V. M., and A. W. May. 1964. Trawl selectivity and girth-length relationships for cod in ICNAF Subarea 2. ICNAF Meeting Doc. 64/30, Ser. No. 1325. 19 p. [see ICNAF Res. Bull. 2: 8-18].

1 May, A. W. 1964. An asymmetrical pair of cod otoliths. J. Fish. Res. Board Can. 21: 413-414.

3 May, A. W. 1964. Determination of fish growth by back-calculation from scales, with application to haddock, (Melanogrammus aeglefinus (L.) of the Newfoundland area. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 175 p.

4 May, A. W. 1964. New cod fishing grounds off Labrador and the northeast coast of Newfoundland. Trade News 16(12): 3-6.

3 May, A. W. 1964. The validity of otolith ages of southern Grand Bank cod. ICNAF Meeting Doc. 64/45, Ser. No. 1340. 8 p. [see ICNAF Res. Bull. 2: 19-24].

3 Pinhorn, A. T., and A. M. Fleming. 1964. A comparison of random and stratified sampling methods for age and growth studies in the Newfoundland inshore cod fishery. ICNAF Meeting Doc. 64/46, Ser. No. 1342. 13 p. [see ICNAF Res. Bull. 2: 25-30].

1 Pitt, T. K. 1964. Fecundity of the American plaice, Hippoglossoides platessoides (Fabr.) from Grand Bank and Newfoundland areas. J. Fish. Res. Board Can. 21: 597-612.

1 Rees, E.I.S. 1964. Nessorhamphus ingolfianus Schmidt, an oceanic eel, recorded in Canadian continental waters. J. Fish. Res. Board Can. 21: 209-211.

1 Rees, E.I.S. 1964. The sooty shearwater Procelaria grisea on the Newfoundland bank. Ibis 106: 118-119.

3 Sandeman, E. J. 1964. Age determination and growth rate of redfish (Sebastes sp.) from selected areas around Newfoundland. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 156 p.

1 Squires, H. J. 1964. Pagurus pubescens and a proposed new name for a closely related species in the Northwest Atlantic (Decapoda Anomura). J. Fish. Res. Board Can. 21: 355-365.

1 Squires, H. J. 1964. Neotype of Argis lar compared with Argis dentata (Crustacea: Decapoda). J. Fish. Res. Board Can. 21: 461-467.

3 Templeman, W. 1964. Report on the status of fisheries and researches in Subarea 3 during 1963. ICNAF Annu. Proc. 14: 35-38 [also ICNAF Meeting Doc. 64/108, Ser. No. 1404].

3 Templeman, W., and J. C. Medcof. 1964. Canadian research report, 1963. ICNAF Redb. 1964(II): 3-34 [also ICNAF Meeting Doc. 64/36, Ser. No. 1331].

PUBLICATIONS - 1965

4 Anon. 1965. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for the year 1964 - with investigators' summaries as appendices. 61 p.

4 Anon. 1965. [Edited by V. M. Hodder] Fishery investigations and groundfish landings - Newfoundland, 1964. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12: 28 p.

1 Blair, A. A. 1965. Bay of Islands and Humber River Atlantic salmon investigations. J. Fish. Res. Board Can. 22: 599-620.

4 Blair, A. A. 1965. Introduction of pink salmon, p. 21-23. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

3 Fleming, A. M. 1965. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1963 by Divisions, months, and gears. In ICNAF Stat. Bull. 13.

1 Fleming, A. M. 1965. Trends in catch, age, and size of cod from the commercial longline fishery at Bonavista, Newfoundland, 1952-62. J. Fish. Res. Board Can. 22: 465-474.

3 Fleming, A. M., A. W. May, and C. J. Elms. 1965. Canada (Newfoundland) length frequencies of cod, haddock, redfish, and American plaice (ICNAF Subareas 2, 3, and 4), commercial samples, 1963. In ICNAF Sampl. Yearb. 8.

1 Hodder, V. M. 1965. Trends in the cod fishery off the east coast of Newfoundland and Labrador. ICNAF Res. Bull. 2: 31-41.

3 Hodder, V. M. 1965. The possible effects of temperature on the fecundity of Grand Bank haddock. ICNAF Spec. Publ. 6: 515-522.

3 Hodder, V. M. 1965. Redfish fishing by Canadian (Nfld.) trawlers in the light of proposals for exemption of regulated species in Subarea 3. Fish. Res. Board Can. MS Rep. Biol. Sta. 817: 15 p. [also ICNAF Res. Doc. 65/58, Ser. No. 1524].

3 Hodder, V. M. 1965. Trends in the haddock fishery of Subarea 3. ICNAF Res. Doc. 65/68, Ser. No. 1536. 11 p. [see ICNAF Res. Bull. 3: 55-63].

4 Hodder, V. M. 1965. Haddock, p. 9-11. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

4 Hodder, V. M. 1965. Herring, p. 23. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

1 Hodder, V. M., and A. W. May. 1965. Otter-trawl selectivity and girth-length relationships for cod in ICNAF Subarea 2. ICNAF Res. Bull. 2: 8-18.

1 May, A. W. 1965. The validity of otolith ages of southern Grand Bank cod. ICNAF Res. Bull. 2: 19-24.

4 May, A. W. 1965. Cod. The northern fisheries, p. 1-3. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

3 May, A. W., A. T. Pinhorn, R. Wells, and A. M. Fleming. 1965. Cod growth and temperature in the Newfoundland area. ICNAF Spec. Publ. 6: 545-556.

3 Mercer, M. C. 1965. Contribution to the biology of the short-finned squid, Illex illecebrosus (LeSueur) in the Newfoundland area. Fish. Res. Board Can. MS Rep. Biol. Sta. 834: 36 p.

4 Pinhorn, A. T. 1965. Newfoundland groundfish landings, 1964, p. 24-28. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

1 Pinhorn, A. T., and C. W. Andrews. 1965. Effect of photoperiods on the behaviour of juvenile Atlantic salmon (Salmo salar L.) in vertical and horizontal light gradients. J. Fish. Res. Board Can. 22: 369-383.

1 Pinhorn, A. T., and A. M. Fleming. 1965. A comparison of random and stratified sampling methods for age and growth studies in the Newfoundland inshore cod fishery. ICNAF Res. Bull. 2: 25-30.

4 Pinhorn, A. T., and V. M. Hodder. 1965. Cod. The inshore cod fishery, p. 5-7. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

3 Pinhorn, A. T., and R. Wells. 1965. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1963. Fish. Res. Board Can. MS Rep. Biol. Sta. 816: 7 p. (also ICNAF Res. Doc. 65/32, Ser. No. 1496).

1 Pitt, T. K. 1965. Modification of the whirling vessel for fecundity studies. J. Fish. Res. Board Can. 22: 247-251.

4 Pitt, T. K. 1965. American plaice, p. 12-14. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

3 Sandeman, E. J. 1965. The occurrence of some regulated fish species with redfish in research vessel catches in ICNAF Divisions 3N, 3O, 3P, 4RST, and 4W. Fish. Res. Board Can. MS Rep. Biol. Sta. 822: 25 p. (also ICNAF Res. Doc. 65/44, Ser. No. 1508).

4 Sandeman, E. J. 1965. Redfish, p. 15-17. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

1 Squires, H. J. 1965. A new species of Calocaris (Crustacea: Decapoda, Thalassinidea) from the northwest Atlantic. J. Fish. Res. Board Can. 22: 1-11.

1 Squires, H. J. 1965. Larvae and megalopa of Argis dentata (Crustacea: Decapoda) from Ungava Bay. J. Fish. Res. Board Can. 22: 69-82.

3 Squires, H. J. 1965. Decapod crustaceans of Newfoundland, Labrador and the Canadian eastern Arctic. Fish. Res. Board Can. MS Rep. Biol. Sta. 810: .212 p. (also Ph.D. thesis, Univ. Durham, Kings College, Newcastle upon Tyne, 1963).

4 Squires, H. J. 1965. Lobsters and oysters, p. 18-20. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

4 Templeman, W. 1965. Cod tagging, 1964, p. 8. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 12.

1 Templeman, W. 1965. Some abnormalities in skates (Raja) of the Newfoundland area. J. Fish. Res. Board Can. 22: 237-238.

1 Templeman, W. 1965. Rare skates of the Newfoundland and neighbouring areas. J. Fish. Res. Board Can. 22: 259-279.

1 Templeman, W. 1965. Some resemblances and differences between Raja erinacea and Raja ocellata, including a method of separating mature and large immature individuals of these two species. J. Fish. Res. Board Can. 22: 899-912.

1 Templeman, W. 1965. Lymphocystis disease in American plaice of the eastern Grand Bank. J. Fish. Res. Board Can. 22: 1345-1356.

3 Templeman, W. 1965. Some of the unknowns in research information necessary for calculation of maximum sustained yields of commercial fishes in the ICNAF area. ICNAF Redb. 1965(III): 153-163 (also ICNAF Res. Doc. 65/25, Ser. No. 1485).

3 Templeman, W. 1965. Mass mortalities of marine fishes in the Newfoundland area presumably due to low temperature. ICNAF Spec. Publ. 6: 137-148.

3 Templeman, W. 1965. Some instances of cod and haddock behaviour and concentrations in the Newfoundland and Labrador areas in relation to food. ICNAF Spec. Publ. 6: 449-462.

3 Templeman, W. 1965. Relation of periods of successful year-classes of haddock on the Grand Bank to periods of success of year-classes for cod, haddock and herring in areas to the north and east. ICNAF Spec. Publ. 6: 523-534.

3 Templeman, W. 1965. Anomalies of sea temperature at Station 27 off Cape Spear and of air temperature at Torbay-St. John's. ICNAF Spec. Publ. 6: 795-806.

3 Templeman, W., and A. M. Fleming. 1965. Cod and low temperature in St. Mary's Bay, Newfoundland. ICNAF Spec. Publ. 6: 131-136.

3 Templeman, W., and J. A. Gulland. 1965. Review of possible conservation actions for the ICNAF area. ICNAF Annu. Proc. 15: 47-56 [also ICNAF Comm. Doc. 65/12, Ser. No. 1450].

3 Templeman, W., and J. L. Hart. 1965. Canadian research report, 1964. ICNAF Redb. 1965(II): 3-35 [also ICNAF Res. Doc. 65/12, Ser. No. 1472].

3 Templeman, W., and V. M. Hodder. 1965. Distribution of haddock on the Grand Bank in relation to season, depth and temperature. ICNAF Spec. Publ. 6: 171-188.

3 Templeman, W., and V. M. Hodder. 1965. Distribution of haddock on St. Pierre Bank (ICNAF Division 3Ps) by season, depth and temperature. ICNAF Spec. Publ. 6: 189-198.

3 Templeman, W., and A. W. May. 1965. Research vessel catches of cod in the Hamilton Inlet Bank area in relation to depth and temperature. ICNAF Spec. Publ. 6: 149-166.

3 Templeman, W., and A. W. May. 1965. Effect of the biological environment (including parasites) on the distribution of adult fish. Convener: W. Templeman, Rapporteur: A. W. May. ICNAF Spec. Publ. 6: 11-12.

3 Wells, R. 1965. Fish eggs and larval collections by CGS BAFFIN and CNAV SACKVILLE off West Greenland, 1963 (Norwestlant I). Fish. Res. Board Can. MS Rep. Biol. Sta. 815: 28 p. [also ICNAF Meeting Doc. 64/53, Ser. No. 1349].

PUBLICATIONS - 1966

4 Anon. 1966. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1965 - with investigators' summaries as appendices. 85 p.

4 Anon. 1966. [Edited by A. M. Fleming] Fishery investigations and groundfish landings in Newfoundland, 1965. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13: 57 p.

3 Blair, A. A. 1966. Atlantic salmon of St. George's Bay, Newfoundland. Fish. Res. Board Can. MS Rep. Biol. Sta. 861: 31 p.

4 Fleming, A. M. 1966. Baby cod surveys, p. 12-14. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Fleming, A. M. 1966. Nylon codtraps, p. 14-16. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Fleming, A. M., and A. T. Pinhorn. 1966. Cod gillnetting - M.V. MARINUS, p. 16-18. In Fish Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Fleming, A. M., and A. T. Pinhorn. 1966. Newfoundland groundfish landings, 1965, p. 51-57. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

1 Hodder, V. M. 1966. Two further records of the American shad in Newfoundland waters. Trans. Am. Fish. Soc. 95: 228-229.

4 Hodder, V. M. 1966. Newfoundland herring investigations in 1965, p. 33-39. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Hodder, V. M. 1966. Recent herring investigations in Newfoundland waters. Canadian Atlantic Herring Fish. Conf., Fredericton, May 1966, p. 39-54. In Can. Fish. Rep. 8.

1 Hodder, V. M. 1966. Trends in the haddock fishery of ICNAF Subarea 3. ICNAF Res. Bull. 3: 55-63.

4 Hodder, V. M., and R. Wells. 1966. Haddock surveys, 1965, p. 21-23. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

3 May, A. W. 1966. Otolith age validation in Labrador cod. ICNAF Res. Doc. 66/22, Ser. No. 1630. 9 p. [see ICNAF Res. Bull. 4: 116-120].

3 May, A. W. 1966. Effect of offshore fishing on the inshore Labrador cod fishery. ICNAF Res. Doc. 66/23, Ser. No. 1631. 13 p. [see ICNAF Res. Bull. 4: 67-75].

3 May, A. W. 1966. Increase in growth of Labrador cod. ICNAF Res. Doc. 66/24, Ser. No. 1632. 10 p.

3 May, A. W. 1966. Length-weight relation in Labrador cod. ICNAF Res. Doc. 66/25, Ser. No. 1633. 4 p.

3 May, A. W. 1966. A note on natural mortality in Labrador cod. ICNAF Res. Doc. 66/26, Ser. No. 1634. 8 p.

3 May, A. W. 1966. Summary of research and status of fisheries in Subarea 2 during 1965. ICNAF Annu. Proc. 16: 37-38 (also ICNAF Res. Doc. 66/71, Ser. No. 1688).

4 May, A. W. 1966. Trends in the Labrador inshore cod fishery, p. 1-2. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

3 May, A. W. 1966. Biology and fishery of Atlantic cod, (Gadus morhua morhua L.), from Labrador. Ph.D. thesis, McGill University, Montreal, P.Q. 212 p.

1 May, A. W., and V. M. Hodder. 1966. Deck sampling of research vessel catches. J. Fish. Res. Board Can. 23: 1083-1088.

3 May, A. W., and F. D. McCracken. 1966. Fish length measurement and proposals for uniformity. Fish. Res. Board Can. MS Rep. Biol. Sta. 873: 19 p. (also ICNAF Res. Doc. 66/64, Ser. No. 1672).

1 Mercer, M. C. 1966. First record of Pyrgopsis lemur (Cephalopoda: Cranchiidae) from the Northwest Atlantic. J. Fish. Res. Board Can. 23: 1257-1258.

4 Mercer, M. C. 1966. Squid investigations, p. 42-48. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

3 Murray, A. R. 1966. A summary of the commercial Atlantic salmon of Newfoundland and Labrador examined by special observers, 1953-1963. Fish. Res. Board Can. MS Rep. Biol. Sta. 885: 89 p.

3 Pinhorn, A. T. 1966. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1964 by Divisions, months and gears. In ICNAF Stat. Bull. 14.

4 Pinhorn, A. T. 1966. Changes in size of cod in the inshore fishery in Newfoundland east and south coast areas, 1961-65, p. 5-6. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Pinhorn, A. T. 1966. Catch per unit of effort for the various gears in the inshore cod fishery at Burin, 1954-65, p. 6-8. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Pinhorn, A. T. 1966. The cod fishery in the Newfoundland southwest coast area (ICNAF Div. 3Ps), p. 8-12. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

3 Pinhorn, A. T., and E. Dunne. 1966. Landings of Canadian (Nfld.) trawlers using small-mesh gear during the 1965 season. ICNAF Res. Doc. 66/65, Ser. No. 1677. 2 p.

3 Pinhorn, A. T., A. W. May, and J. O'Brien. 1966. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples and of cod, haddock, redfish and American plaice (ICNAF Subareas 3 and 4) commercial samples, 1964. In ICNAF Sampl. Yearb. 9.

3 Pinhorn, A. T., R. Wells, and E. Dunne. 1966. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery, 1964. Fish. Res. Board Can. MS Rep. Biol. Sta. 879: 8 p. (also ICNAF Res. Doc. 66/66, Ser. No. 1678).

1 Pitt, T. K. 1966. Sexual maturity and spawning of the American plaice, Hippoglossoides platessoides (Fabricius), from Newfoundland and Grand Bank areas. J. Fish. Res. Board Can. 23: 851-872.

1 Pitt, T. K. 1966. Development of the anal fin of the capelin. J. Fish. Res. Board Can. 23: 1099-1100.

3 Pitt, T. K. 1966. Diurnal variation in the catches of American plaice (Hippoglossoides platessoides Fabr.) from the Grand Bank. ICNAF Res. Doc. 66/44, Ser. No. 1640. 10 p. (also ICNAF Res. Bull. 4: 53-58).

4 Pitt, T. K. 1966. Flatfishes, p. 24-28. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Sandeman, E. J. 1966. Redfish. Trade News 18(8): 19-21.

4 Sandeman, E. J. 1966. Redfish, p. 29-36. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

1 Squires, H. J. 1966. Reproduction in Sphyrion lumpi, a copepod parasitic on redfish (Sebastes spp.). J. Fish. Res. Board Can. 23: 521-526.

2 Squires, H. J. 1966. Distribution of decapod Crustacea in the Northwest Atlantic. Amer. Geog. Soc. Atlas Mar. Envir., Folio 12, 4 p., 4 pl.

1 Squires, H. J. 1966. Feeding habits of the squid, Illex illecebrosus. Nature 211: 1321.

4 Squires, H. J. 1966. Marine research in Newfoundland on marine invertebrates. Newfoundland Journal of Commerce 33(8): 29-31.

4 Squires, H. J. 1966. Biological sampling essential to an understanding of local populations of lobsters, p. 40-41. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Squires, H. J. 1966. The age and early life of bait squid - some possibilities, p. 41-42. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Squires, H. J. 1966. First season growth of oysters (Crassostrea virginica) in Two-Guts barachois pond, p. 48-49. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Squires, H. J. 1966. Preliminary experimental harvesting of Irish moss (Chondrus crispus) (seaweed) in Port au Port Bay, p. 49-50. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

1 Templeman, W. 1966. A record of Bathypterois dubius Vaillant from the western North Atlantic, and review of status of the species. J. Fish. Res. Board Can. 23: 715-722.

4 Templeman, W. 1966. The fisheries situation in the Northwest Atlantic. Fisheries of Canada 19(3): 3-10.

2 Templeman, W. 1966. Marine resources of Newfoundland. Bull. Fish. Res. Board Can. 154: 170 p.

3 Templeman, W. 1966. Preliminary note on distribution of Atlantic salmon off the Newfoundland bank and shelf areas, 21 March-1 May 1966. ICES/ICNAF Salmon Doc. 66/11, Ser. No. 1691. 5 p.

3 Templeman, W. 1966. Atlantic salmon from the Labrador Sea and off West Greenland, taken during A. T. CAMERON cruise, July-August 1965. ICES/ICNAF Salmon Doc. 66/12, Ser. No. 1692. 71 p. [see ICNAF Res. Bull. 4: 5-40].

1 Templeman, W., and R. L. Haedrich. 1966. Distributions and comparisons of Centrolophus niger (Gmelin) and Centrolophus britannicus Günther (Centrolophidae) from the North Atlantic. J. Fish. Res. Board Can. 23: 1181-1183.

3 Templeman, W., and J. L. Hart. 1966. Canadian research report, 1965. ICNAF Redb. 1966(II): 3-24 [also ICNAF Res. Doc. 66/30, Ser. No. 1621].

4 Wells, R. 1966. The cod fishery on the northeast coast of Newfoundland, p. 1-3. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

4 Wells, R., A. W. May, and M. Miles. 1966. Cod surveys offshore, 1965, p. 19-20. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 13.

3 Winters, G. H. 1966. Contribution to the life history of the capelin Mallotus villosus, in Newfoundland waters. Fish. Res. Board Can. MS Rep. Biol. Sta. 870: 56 p.

## PUBLICATIONS - 1967

1 Ackman, R., J. Hingley, and A. W. May. 1967. Dimethyl-β-propiothetin dimethyl sulphide in Labrador cod. J. Fish. Res. Board Can. 24: 457-461.

4 Anon. 1967. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1966 - with investigators' summaries as appendices. 67 p.

4 Anon. 1967. [Edited by A. M. Fleming.] Fishery investigations and groundfish landings in Newfoundland, 1966. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14: 47 p.

4 Blair, A. A. 1967. Pink salmon transplants, p. 32-34. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

4 Fleming, A. M., and A. T. Pinhorn. 1967. Commercial groundfish landings in Newfoundland, p. 41-47. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

4 Hourston, A. S. 1967. Herring, p. 18-26. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

1 May, A. W. 1967. Fecundity of Atlantic cod. J. Fish. Res. Board Can. 24: 1531-1551.

1 May, A. W. 1967. Effect of offshore fishing on the inshore Labrador cod fishery. ICNAF Res. Bull. 4: 67-75.

1 May, A. W. 1967. Otolith age validation in Labrador cod. ICNAF Res. Bull. 4: 116-120.

1 May, A. W. 1967. Occurrence of ptarmigan off northern Labrador. Can. Field-Nat. 81: 227-228.

3 May, A. W. 1967. Biological data for bio-economic assessment of Subarea 2 cod. ICNAF Res. Doc. 67/69, Ser. No. 1860. 5 p.

3 May, A. W. 1967. Possible causes of growth variations in Subarea 2 cod. ICNAF Res. Doc. 67/77, Ser. No. 1873. 9 p.

3 May, A. W. 1967. Biological data on cod from the summer fishery on the north shore Strait of Belle Isle. ICNAF Res. Doc. 67/78, Ser. No. 1874. 23 p.

4 Mercer, M. C. 1967. Cephalopoda of Canada: a preliminary review. Adv. Abstr. Contrib. Fish. Aquat. Sci. India 3: 50-52.

1 Mercer, M. C. 1967. Anomalous record of a California sea lion, Zalophus californianus, from Newfoundland. J. Fish. Res. Board Can. 24: 1623-1626.

1 Mercer, M. C. 1967. Wintering of pilot whales, Globicephala melaena, in Newfoundland inshore waters. J. Fish. Res. Board Can. 24: 2481-2484.

1 Mercer, M. C. 1967. Records of the Atlantic walrus, Odobenus rosmarus rosmarus, from Newfoundland. J. Fish. Res. Board Can. 24: 2631-2635.

4 Murray, A. R. 1967. The Atlantic salmon of Newfoundland, p. 348-363. In J. R. Smallwood [ed.] The Book of Newfoundland, Newfoundland Book Publishers, St. John's, Newfoundland.

1 Paulik, G. J., A. S. Hourston, and P. A. Larkin. 1967. Exploitation of multiple stocks by a common fishery. J. Fish. Res. Board Can. 24: 2527-2537.

3 Pinhorn, A. T. 1967. Canada (Newfoundland) statistics of fishing efforts and landings from the ICNAF Convention Area for 1965 by Divisions, months and gears. In ICNAF Stat. Bull. 15.

3 Pinhorn, A. T., and E. Dunne. 1967. Landings of Canadian (Nfld.) trawlers using small-mesh gear during the 1966 season. ICNAF Res. Doc. 67/45, Ser. No. 1836. 4 p.

3 Pinhorn, A. T., A. W. May, and J. O'Brien. 1967. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, and of cod, haddock, redfish and American plaice (ICNAF Subareas 3 and 4) commercial samples, 1965. In ICNAF Sampl. Yearb. 10.

3 Pinhorn, A. T., R. Wells, and E. Dunne. 1967. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1965. ICNAF Res. Doc. 67/46, Ser. No. 1832. 7 p.

1 Pitt, T. K. 1967. Age and growth of American plaice (Hippoglossoides platessoides) in the Newfoundland area of the Northwest Atlantic. J. Fish. Res. Board Can. 24: 1077-1099.

1 Pitt, T. K. 1967. Diurnal variation in the catches of American plaice, Hippoglossoides platessoides Fabr., from the Grand Bank. ICNAF Res. Bull. 4: 53-58.

4 Pitt, T. K. 1967. Flatfishes, p. 13-17. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

1 Squires, H. J. 1967. Growth and hypothetical age of the Newfoundland bait squid Illex illecebrosus illecebrosus. J. Fish. Res. Board Can. 24: 1209-1217 [also Abstracts of Proceedings of the Eleventh Pacific Science Congress, Tokyo, Vol. 7, Divisional Meetings, Fisheries Science, 1966, Paper No. 141.

1 Squires, H. J. 1967. Decapod Crustacea from CALANUS collections in Hudson Bay in 1953, 1954, and 1958-61. J. Fish. Res. Board Can. 24: 1873-1903.

4 Squires, H. J. 1967. Suggested installation for holding and farming lobsters, p. 35-40. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

3 Squires, H. J. 1967. Relation of temperature to growth and self-propagation of Pandalus borealis in Newfoundland. F.A.O. World Conference on Biology and Culture of Shrimp and Prawns, Mexico City, June. Experience Paper 3, Agenda Item 4, 8 p.

1 Squires, H. J. 1967. Some aspects of adaptation in decapod Crustacea in the Northwest Atlantic, p. 987-995. In Proc. Symp. Crustacea, Pt. III.

3 Templeman, W. 1967. Distribution and characteristics of Atlantic salmon over oceanic depths and on the bank and shelf slope areas off Newfoundland, March-May 1966. ICNAF Res. Doc. 67/65, Ser. No. 1856. 41 p. [see ICNAF Res. Bull. 5: 62-85].

3 Templeman, W. 1967. Hydrographic observations in Subareas 1, 2 and 3, July-August 1965. ICNAF Redb. 1966(III): 143-158 [also ICNAF Res. Doc. 66/43, Ser. No. 1652].

1 Templeman, W. 1967. Predation on living fishes on longline in Baffin Bay by the amphipod Eurythenes gryllus (Lichtenstein), and a new distribution record. J. Fish. Res. Board Can. 24: 215-217.

1 Templeman, W. 1967. Adult redfish, Sebastes mentella, pelagic over oceanic depths in the Labrador Sea. J. Fish. Res. Board Can. 24: 1275-1290.

3 Templeman, W. 1967. Anomalies of sea temperature at Station 27 off Cape Spear and of air temperature at Torbay-St. John's. ICNAF Redb. 1967(IV): 69-75 [also ICNAF Res. Doc. 67/26, Ser. No. 1804].

1 Templeman, W. 1967. Atlantic salmon from the Labrador Sea and off West Greenland taken during A. T. CAMERON cruise, July-August 1965. ICNAF Res. Bull. 4: 5-40.

4 Templeman, W. 1967. Capelin distribution, spawning, migrations, concentrations and abundance in the Canadian area of the Northwest Atlantic. Conference on Commercial Possibilities for Capelin, February 1, 1967, Ottawa, Ont.

3 Templeman, W., and J. L. Hart. 1967. Canadian research report, 1966. ICNAF Redb. 1967(II): 3-25 [also ICNAF Res. Doc. 67/11, Ser. No. 1794].

3 Wells, R. 1967. Haddock length conversion factors for St. Pierre Bank. ICNAF Res. Doc. 67/81, Ser. No. 1877. 3 p. [see ICNAF Res. Bull. 5: 137-140].

4 Wells, R. 1967. Haddock, p. 10-12. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

3 Wiles, M. 1967. Mortality in northeastern Gulf of St. Lawrence cod during 1947-66. ICNAF Res. Doc. 67/84, Ser. No. 1880. 12 p. [see ICNAF Res. Bull. 5: 5-43].

3 Wiles, M. 1967. Trends in the cod fishery in the northeastern Gulf of St. Lawrence during 1953-65 (ICNAF Div. 4R and 4S). ICNAF Res. Doc. 67/79, Ser. No. 1875. 27 p. [see ICNAF Res. Bull. 5: 5-43].

3 Wiles, M. 1967. Changes in the growth rate of cod from the northeastern Gulf of St. Lawrence (ICNAF Divisions 4R and 4S) during 1947-66. ICNAF Res. Doc. 67/80, Ser. No. 1876. 10 p. [see ICNAF Res. Bull. 5: 5-43].

3 Wiles, M. 1967. Otolith age validation in cod from the northeastern Gulf of St. Lawrence. ICNAF Res. Doc. 67/87, Ser. No. 1883. 8 p. [see ICNAF Res. Bull. 5: 5-43].

4 Wiles, M. 1967. The cod fishery on the west coast of Newfoundland 1956-66, p. 1-6. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

4 Wiles, M. 1967. A comparison of the landings by different gears at Port au Choix, p. 6-9. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

4 Winters, G. H. 1967. The capelin: Newfoundland's latent resource. Newfoundland Journal of Commerce 34(8): 7, 10, 46-47.

4 Winters, G. H. 1967. Capelin, p. 26-31. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 14.

4 Winters, G. H. 1967. Some biological aspects of the capelin in Newfoundland waters. Conference on Commercial Possibilities for Capelin, February 1, 1967, Ottawa, Ont.

PUBLICATIONS - 1968

4 Anon. 1968. [Edited by W. Templeman] Fisheries Research Board of Canada Report of the Biological Station, St. John's, Newfoundland for 1967 - with investigators' summaries as appendices. 59 p.

4 Anon. 1968. [Edited by A. M. Fleming] Fishery investigations and groundfish landings in Newfoundland, 1967. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15: 44 p.

4 Blair, A. A. 1968. Pink salmon find new home in Newfoundland. Fisheries of Canada 21(4): 9-12.

4 Blair, A. A. 1968. Pink salmon fishery in Newfoundland, p. 24-26. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

1 Ennis, G. P. 1968. Occurrences of the staghorn sculpin (Gymnocanthus tricuspis) in Newfoundland waters. J. Fish. Res. Board Can. 25: 2729-2731.

4 Ennis, G. P. 1968. Young lobsters prefer rocky bottom, p. 27-29. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

4 Fleming, A. M., and A. T. Pinhorn. 1968. Commercial groundfish landings in Newfoundland, p. 39-44. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

1 Hourston, A. S. 1968. Abnormal cessation of growth in a herring otolith. J. Fish. Res. Board Can. 25: 2503-2504.

3 Hourston, A. S. 1968. The Newfoundland herring fishery and its implications concerning the resource. ICNAF Redb. 1968(III): 67-74 [also ICNAF Res. Doc. 68/49, Ser. No. 2031].

4 Hourston, A. S. 1968. Herring landings and catches by fishing season in Newfoundland waters, p. 1-9. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

4 Hourston, A. S. 1968. Migration and distribution of herring during the 1966-67 season, p. 9-13. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

4 Hourston, A. S. 1968. Herring spawnings in 1967, p. 13-17. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

3 Hourston, A. S. 1968. Age determination of herring at the Biological Station, St. John's, Newfoundland. Fish. Res. Board Can. Tech. Rep. 49: 24 p.

3 Hourston, A. S., and R. Chaulk. 1968. Herring landings and catches in Newfoundland and their implications concerning the distribution and abundance of the stocks. Fish. Res. Board Can. Tech. Rep. 58: 77 p.

3 Hourston, A. S., R. Chaulk, S. Parsons, and J. A. Thomson. 1968. Herring sampling data and summary tabulations for Newfoundland, 1967-68. Fish. Res. Board Can. Tech. Rep. 97: 220 p.

3 Hourston, A. S., R. Chaulk, and J. A. Thomson. 1968. Herring sampling data and summary tabulations for Newfoundland, 1966-67. Fish. Res. Board Can. Tech. Rep. 96: 172 p.

3 Hourston, A. S., V. M. Hodder, and J. A. Thomson. 1968. Herring sampling data and summary tabulations for Newfoundland, 1965-66. Fish. Res. Board Can. Tech. Rep. 95: 55 p.

3 Hourston, A. S., R. D. Humphreys, and J. A. Thomson. 1968. Herring sampling data and summary tabulations for Newfoundland, 1964-65. Fish. Res. Board Can. Tech. Rep. 94: 35 p.

4 Lear, W. H. 1968. Greenland halibut. Newfoundland Journal of Commerce 35(8): 21-22, 38.

4 Lear, W. H. 1968. Greenland halibut, p. 36-38. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

3 Lear, W. H. 1968. Length-weight relationship of commercial-size Greenland halibut, Reinhardtius hippoglossoides (Walbaum). ICNAF Res. Doc. 68/47, Ser. No. 2029. 5 p. [see ICNAF Res. Bull. 6: 119-121].

3 *Lilly, G. R. 1968. Some aspects of the ecology of Irish moss, Chondrus crispus (L.) Stack., in Newfoundland waters. Fish. Res. Board Can. Tech. Rep. 43: 44 p.

3 May, A. W. 1968. Biological data on cod from the summer fishery on the north shore, Strait of Belle Isle. Fish. Res. Board Can. Tech. Rep. 27: 21 p.

3 May, A. W. 1968. Preliminary report on catches of Atlantic salmon in the Labrador Sea, March 29-April 5, 1968. ICNAF Res. Doc. 68/77, Ser. No. 2063. 2 p. [also ICES/ICNAF Salmon Doc. 68/17, Ser. No. 2063].

3 May, A. W. 1968. Revision of estimated fishing activity for groundfish in ICNAF Subareas 2 and 3, 1959-67, with remarks on some groundfish stocks and fisheries. ICNAF Res. Doc. 68/93, Ser. No. 2081. 10 p.

3 May, A. W., and J. Messtorff. 1968. Comparative fishing by research vessels A. T. CAMERON and WALTHER HERWIG. ICNAF Redb. 1968(III): 21-28 [also ICNAF Res. Doc. 68/96, Ser. No. 2088].

3 Mercer, M. C. 1968. Systematics and biology of the sepiolid squids of the genus Rossia (Owen, 1835) in Canadian waters with a preliminary review of the genus. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 96 p.

3 Mercer, M. C. 1968. A synopsis of the recent Cephalopods of Canada. Proc. Symp. Mollusca 1: 265-276.

1 Murray, A. R. 1968. Estuarine net counting fence for trapping Atlantic salmon. Trans. Am. Fish. Soc. 97: 282-286.

1 Murray, A. R. 1968. Smolt survival and adult utilization of Little Codroy River, Newfoundland, Atlantic salmon. J. Fish. Res. Board Can. 25: 2165-2218.

3 Murray, A. R. 1968. A counting fence of netting for Atlantic salmon in the estuary of the Little Codroy River, Newfoundland. Fish. Res. Board Can. Tech. Rep. 38: 19 p.

3 Murray, A. R. 1968. Numbers of Atlantic salmon and brook trout captured and marked at the Little Codroy River, Newfoundland, counting fence and auxiliary traps, 1954-63. Fish. Res. Board Can. Tech. Rep. 84: 135 p.

3 Murray, A. R. 1968. Some climatic and geomorphic aspects of the Little Codroy River, Newfoundland. Fish. Res. Board Can. Tech. Rep. 98: 185 p.

3 Murray, A. R. 1968. The ecology of the Sphaeriidae of Lac la Ronge, Saskatchewan. M.A. thesis, Univ. Saskatchewan, Saskatoon, Sask. 143 p.

3 Pinhorn, A. T., A. W. May, and E. Dunne. 1968. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1966. ICNAF Res. Doc. 68/48, Ser. No. 2030. 5 p.

3 Pinhorn, A. T., A. W. May, and J. O'Brien. 1968. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, and of cod, haddock, redfish, American plaice, witch, and yellowtail (ICNAF Subareas 3 and 4) commercial samples, 1966. In ICNAF Sampl. Yearb. 11.

3 Pinhorn, A. T., R. Wells, and E. Dunne. 1968. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1965. Fish. Res. Board Can. MS Rep. Biol. Sta. 987: 8 p.

3 Sandeman, E. J. 1968. Diurnal variation in availability of different sizes of redfish, (Sebastes mentella). ICNAF Res. Doc. 68/83, Ser. No. 2071. 22 p. [see ICNAF Res. Bull. 6: 35-46].

3 Sandeman, E. J. 1968. Age determination and growth rate of redfish (Sebastes sp.) from selected areas around Newfoundland. ICNAF Res. Doc. 68/29, Ser. No. 2004. 37 p. [see ICNAF Res. Bull. 6: 79-106].

1 Squires, H. J. 1968. Decapod Crustacea from the Queen Elizabeth and nearby islands in 1962. J. Fish. Res. Board Can. 25: 347-362.

4 Squires, H. J. 1968. Squid drying in Newfoundland, p. 29-34. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

1 Squires, H. J., and G. P. Ennis. 1968. Lobsters from 95 fathoms deep off St. John's, Newfoundland. J. Fish. Res. Board Can. 25: 2723-2724.

3 *Steele, D. H., and P. Brunel. 1968. Collections of amphipods of the genus Anonyx, mainly from the Atlantic and Arctic coasts of North America. Fish. Res. Board Can. Tech. Rep. 47: 73 p.

1 Stewart, J. E., and H. J. Squires. 1968. Adverse conditions as inhibitors of ecdysis in the lobster Homarus americanus. J. Fish. Res. Board Can. 25: 1763-1774.

3 Templeman, W. 1968. Experimental snella fishing for cod on West Greenland banks, August 1965, and comparision of a snella and an otter-trawl catch of cod from the same locality of Store Hellefiske Bank. ICNAF Res. Doc. 68/2, Ser. No. 1983. 21 p. [see ICNAF Res. Bull. 6: 53-64].

1 Templeman, W. 1968. A review of the morid fish genus Halargyreus with first records from the western North Atlantic. J. Fish. Res. Board Can. 25: 877-901.

1 Templeman, W. 1968. Review of some aspects of capelin biology in the Canadian area of the Northwest Atlantic. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 158: 41-53.

3 Templeman, W. 1968. Temperatures and salinities at Station 27 and in the St. John's-Flemish Cap section, 1967. ICNAF Redb. 1968(III): 37-39 [also ICNAF Res. Doc. 68/3, Ser. No. 1984].

1 Templeman, W. 1968. Distribution and characteristics of Atlantic salmon over oceanic depths and on the bank and shelf slope areas off Newfoundland, March-May, 1966. ICNAF Res. Bull. 5: 62-85.

3 Templeman, W., and F. D. McCracken. 1968. Canadian research report, 1967. ICNAF Redb. 1968(II): 3-23 [also ICNAF Res. Doc. 68/5, Ser. No. 1986].

1 Van der Land, J., and W. Templeman. 1968. Two new species of Gyrocotyle (Monogenea) from Hydrolagus affinis (Brito Capello) (Holocephali). J. Fish. Res. Board Can. 25: 2365-2385.

1 Wells, R. 1968. Haddock length conversion factors for St. Pierre Bank. ICNAF Res. Bull. 5: 137-140.

4 Wells, R. 1968. New brood of haddock on St. Pierre Bank, p. 35. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

3 Wells, R. 1968. Report on American plaice eggs and larvae. ICNAF Spec. Publ. 7(I): 181-182; (II): 266-278 [also ICNAF Meeting Doc. 64/53, Ser. No. 1349].

3 Wells, R. 1968. The biology of the cod (Gadus morhua (L.)) of the northeast coast of Newfoundland. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 73 p.

1 Wiles, M., and A. W. May. 1968. Biology and fishery of the west Newfoundland cod stock. ICNAF Res. Bull. 5: 5-43.

4 Winters, G. H. 1968. Capelin, p. 17-23. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 15.

## PUBLICATIONS - 1969

4 Anon. 1969. [Edited by W. Templeman] Fisheries Research Board of Canada Annual Report and Investigators' Summaries - 1968. Biological Station, St. John's, Newfoundland. 58 p.

4 Anon. 1969. [Edited by A. M. Fleming] Fishery investigations and groundfish landings in Newfoundland, 1968. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16: 35 p.

4 Blair, A. A. 1969. Small return of adult pink salmon in 1968, p. 22-23. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

1 Ennis, G. P. 1969. Occurrences of the little sculpin, Myoxocephalus aeneus, in Newfoundland waters. J. Fish. Res. Board Can. 26: 1689-1694.

3 Ennis, G. P. 1969. The biology of the shorthorn sculpin, Myoxocephalus scorpius (L.) in Newfoundland waters. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 71 p.

4 Fleming, A. M. 1969. Newfoundland fisheries, p. 434-440. In F. E. Firth [ed.] Encyclopedia of Marine Resources, Reinhold Book Corp., New York, N.Y.

4 Fleming, A. M., and A. T. Pinhorn. 1969. Commercial groundfish landings in Newfoundland, p. 27-35. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

1 Fürst, M., and O. L. Nyman. 1969. Isoenzyme polymorphism in Mysis relicta Lovén. Inst. Freshwater Res. Drottningholm Rep. 49: 44-48.

4 Hodder, V. M. 1969. Herring landings and distribution of catches in Newfoundland, 1967-68. Fisheries of Canada 22(4): 3-6.

4 Hourston, A. S. 1969. Herring landings in Newfoundland in 1967 and catches from Newfoundland waters for the 1966-67 and 1967-68 fishing seasons, p. 1-8. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

4 Hourston, A. S. 1969. Distribution and migratory movements of major herring stocks in Newfoundland waters, p. 8-10. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

3 Hourston, A. S. 1969. Catch in thousands of fish and catch per unit of effort for the Newfoundland herring seine fisheries, 1964-65 to 1967-68. Fish. Res. Board Can. Tech. Rep. 137: 122 p.

3 Hourston, A. S. 1969. Catch (tons) per unit of effort by boat, area and week and effort modifers for the Newfoundland herring seine fisheries, 1964-65 to 1967-68. Fish. Res. Board Can. MS Rep. 1056: 34 p.

3 Hourston, A. S., R. Chaulk, S. Parsons, and J. A. Thomson. 1969. Newfoundland herring sampling data, 1967-68. Fish. Res. Board Can. MS Rep. 1035: 432 p.

3 Hourston, A. S., R. Chaulk, and J. A. Thomson. 1969. Newfoundland herring sampling data, 1966-67. Fish. Res. Board Can. MS Rep. 1034: 294 p.

3 Hourston, A. S., V. M. Hodder, and J. A. Thomson. 1969. Newfoundland herring sampling data, 1965-66. Fish. Res. Board Can. MS Rep. 1033: 92 p.

3 Hourston, A. S., R. D. Humphreys, and J. A. Thomson. 1969.. Newfoundland herring sampling data, 1964-65. Fish. Res. Board Can. MS Rep. 1032: 26 p.

3 Hourston, A. S., and L. S. Parsons. 1969. Opaque and hyaline otolith nuclei as indicators of spring and autumn spawning herring in Newfoundland waters. Fish. Res. Board Can. Tech. Rep. 138: 26 p.

1 Lear, W. H. 1969. Length-weight relationship of commercial-size Greenland halibut, Reinhardtius hippoglossoides (Walbaum). ICNAF Res. Bull. 6: 119-121.

4 May, A. W. 1969. Labrador fisheries, p. 342-346. In F. E. Firth [ed.] Encyclopedia of Marine Resources, Reinhold Book Corp., New York, N.Y.

4 May, A. W. 1969. Marine fisheries for Atlantic salmon. Arctic Circular 19(2): 31-38.

4 May, A. W. 1969. Atlantic salmon fisheries at West Greenland and on the high seas, p. 17-22. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

3 May, A. W. 1969. Catches and estimated fishing activity in Subareas 2 and 3, 1966 and 1967. ICNAF Res. Doc. 69/84, Ser. No. 2250. 4 p.

4 Mercer, M. C. 1969. Biological characteristics of migrant ommastrephid squid, Illex illecebrosus (LeSueur), in the Newfoundland area [Abstract]. Am. Zool. 9: 505.

4 Mercer, M. C. 1969. American oysters on the Newfoundland west coast, p. 24. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

3 Mercer, M. C. 1969. A. T. CAMERON Cruise 130, otter-trawl survey from southern Nova Scotia to Cape Hatteras, March-April 1967. Fish. Res. Board Can. Tech. Rep. 103: 24 p.

3 Mercer, M. C. 1969. A. T. CAMERON Cruise 150, otter-trawl survey of the Mid-Atlantic Bight, August-September 1968. Fish. Res. Board Can. Tech. Rep. 122: 47 p.

3 Murray, A. R., and T. J. Harmon. 1969. A preliminary consideration of the factors affecting the productivity of Newfoundland streams. Fish. Res. Board Can. Tech. Rep. 130: 405 p.

1 Murray, A. R., D.R.L. White, and R. S. Whitaker. 1969. Muscle damage in adult Atlantic salmon caught in nylon gillnets. J. Fish. Res. Board Can. 26: 1694-1696.

1 Nyman, O. L. 1969. Polymorphic serum esterases in two species of freshwater fishes. J. Fish. Res. Board Can. 26: 2532-2534.

3 Nyman, O. L. 1969. Den biokemiska systematiken. Fauna Flora (Stockh.) 1: 2-13.

3 Nyman, O. L. 1969. Identification of salmon off the west coast of Greenland. ICNAF Spec. Meeting on "The bio-chemical and serological identification of fish stocks", Dublin. 3 p.

3 Nyman, O. L. 1969. Biochemical studies on Atlantic salmon (Salmo salar L.) and some of its parasites. ICNAF Res. Doc. 69/37, Ser. No. 2172. 3 p.

1 Nyman, O. L., and L. Westin. 1969. A contribution to the methods of classification for some Mysidae and Gammarus species in the Baltic. Inst. Freshwater Res. Drottningholm Rep. 49: 157-163.

1 Nyman, O. L., and L. Westin. 1969. Blood protein systematics of Cottidae in the Baltic drainage area. Inst. Freshwater Res. Drottningholm Rep. 49: 164-174.

1 Pinhorn, A. T. 1969. Fishery and biology of Atlantic cod (Gadus morhua) off the southwest coast of Newfoundland. J. Fish. Res. Board Can. 26: 3133-3164.

3 Pinhorn, A. T. 1969. Cod length conversion factors for Flemish Cap (ICNAF Division 3M). ICNAF Redb. 1969(III): 90-93 [also ICNAF Res. Doc. 69/38, Ser. No. 2175].

3 Pinhorn, A. T. 1969. Assessments of the effects of increases in the mesh size of trawls on the cod fisheries in ICNAF Divisions 3N and 3O. ICNAF Res. Doc. 69/83, Ser. No. 2249. 29 p. [see ICNAF Res. Bull. 7: 32-45].

3 Pinhorn, A. T., A. W. May, and H. M. Churchill. 1969. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, and of cod, haddock, redfish, American plaice, witch and yellowtail (ICNAF Subareas 3 and 4) commercial samples, 1967. In ICNAF Sampl. Yearb. 12.

3 Pinhorn, A. T., A. W. May, and E. Dunne. 1969. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1966. Fish. Res. Board Can. MS Rep. 1010: 6 p.

3 Pinhorn, A. T., A. W. May, R. Wells, and E. Dunne. 1969. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1967. Fish. Res. Board Can. MS Rep. 1058: 5 p. [also ICNAF Res. Doc. 69/56, Ser. No. 2203].

1 Pippy, J.H.C. 1969. Pomphorhynchus laevis (Zoega) Müller, 1776 (Acanthocephala) in Atlantic salmon (Salmo salar) and its use as a biological tag. J. Fish. Res. Board Can. 26: 909-919.

1 Pippy, J.H.C. 1969. Kidney disease in juvenile Atlantic salmon (Salmo salar) in the Margaree River. J. Fish. Res. Board Can. 26: 2535-2537.

3 Pippy, J.H.C. 1969. Preliminary report on parasites as biological tags in Atlantic salmon (Salmo salar). I. Investigations 1966 to 1968. Fish. Res. Board Can. Tech. Rep. 134: 44 p.

3 Pippy, J.H.C. 1969. Studies on the parasites of Atlantic salmon (Salmo salar) in 1968. ICNAF Res. Doc. 69/50, Ser. No. 2195. 10 p.

1 Pippy, J.H.C., and F. A. Aldrich. 1969. Hepatoxylon trichiuri (Holten 1802) (Cestoda-Trypanorhyncha) from the giant squid Architeuthis dux Steenstrup 1857 in Newfoundland. Can. J. Zool. 47: 263-264.

1 Pippy, J.H.C., and G. M. Hare. 1969. Relationship of river pollution to bacterial infection in salmon (Salmo salar) and suckers (Catostomus commersoni). Trans. Am. Fish. Soc. 98: 685-690.

1 Pitt, T. K. 1969. Migrations of American plaice on the Grand Bank and in St. Mary's Bay, 1954, 1959, and 1961. J. Fish. Res. Board Can. 26: 1301-1319.

4 Pitt, T. K. 1969. Average catches of American plaice by the research vessel A. T. CAMERON, 1958-66, p. 12-16. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

1 Sandeman, E. J. 1969. Diurnal variation in availability of different sizes of redfish, Sebastes mentella. ICNAF Res. Bull. 6: 35-46.

1 Sandeman, E. J. 1969. Age determination and growth rate of redfish, Sebastes sp., from selected areas around Newfoundland. ICNAF Res. Bull. 6: 79-106.

1 Squires, H. J. 1969. Decapod Crustacea of the Beaufort Sea and arctic waters eastward to Cambridge Bay, 1960-65. J. Fish. Res. Board Can. 26: 1899-1918.

4 Templeman, W. 1969. Biological research, fishermen, industry and government. Groundfish are most important. The Atlantic Fisherman and Shipping Review, July-August 1969, p. 14-16.

1 Templeman, W. 1969. Experimental snelle fishing for cod, Gadus morhua L., on West Greenland Banks, August 1965, and comparison of a snelle and an otter trawl catch of cod from the same locality of Store Hellefiske Bank. ICNAF Res. Bull. 6: 53-64.

1 Templeman, W. 1969. The scientific name, distribution and characteristics of the blue ling, Molva dypterygia (Pennant), from West Greenland and Newfoundland areas. Fiskeridir. Skr. Ser. Havundersk. 15(3): 145-162.

3 Templeman, W. 1969. Temperatures and salinities at Station 27 and in the St. John's-Flemish Cap section in 1968. ICNAF Redb. 1969(III): 39-44 [also ICNAF Res. Doc. 69/39, Ser. No. 2177].

3 Templeman, W., and F. D. McCracken. 1969. Canadian research report, 1968. ICNAF Redb. 1969(II): 3-22 [also ICNAF Res. Doc. 69/7, Ser. No. 2181].

3 Wells, R. 1969. Fork length-head girth relationships for Grand Bank and St. Pierre Bank haddock. ICNAF Redb. 1969(III): 94-95 [also ICNAF Res. Doc. 69/77, Ser. No. 2242].

4 Wells, R. 1969. Cod landings in Labrador, 1936-68, p. 25-26. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

3 Wells, R. 1969. Growth estimates for Grand Bank cod, 1963 and 1965. ICNAF Res. Doc. 69/76, Ser. No. 2241. 3 p.

3 Wells, R. 1969. Fork length-head girth relationships for Grand Bank and St. Pierre Bank haddock. ICNAF Redb. 1969(III): 94-95 [also ICNAF Res. Doc. 69/77, Ser. No. 2242].

4 Winters, G. H. 1969. Capelin (Mallotus villosus), p. 94-101. In F. E. Firth [ed.] Encyclopedia of Marine Resources, Reinhold Book Corp., New York, N.Y.

4 Winters, G. H. 1969. Migrations of coastal capelin in Trinity Bay, p. 10-11. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 16.

3 Winters, G. H. 1969. Back-calculation of the growth of capelin (Mallotus villosus) in the Canadian Northwest Atlantic from measurements of otoliths. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 56 p.

## PUBLICATIONS - 1970

4 Anon. 1970. [Edited by W. Templeman] Fisheries Research Board of Canada Annual Report and Investigators' Summaries - 1969. Biological Station, St. John's, Newfoundland. 76 p.

1 Ennis, G. P. 1970. Reproduction and associated behaviour in the shorthorn sculpin, Myoxocephalus scorpius, in Newfoundland waters. J. Fish. Res. Board Can. 27: 2037-2045.

1 Ennis, G. P. 1970. Age, growth, and sexual maturity of the shorthorn sculpin, Myoxocephalus scorpius, in Newfoundland waters. J. Fish. Res. Board Can. 27: 2155-2158.

4 Hodder, V. M. 1970. Recent developments in the Newfoundland herring fishery, p. 1-19. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 18.

4 Hodder, V. M. 1970. Recent events in the Canadian Atlantic herring fisheries (résumé), p. 135-137. In Proc. Can. Soc. Wildl. Fish. Biol. Atl. Chapter Annu. Meet. Nov. 4-6, 1970.

3 Hodder, V. M., and R. Chaulk. 1970. Canada (Newfoundland) length frequencies of herring sampled during the commercial seine fishery in ICNAF Subareas 3 and 4, 1965-68. In ICNAF Sampl. Yearb. 13(2).

3 Hodder, V. M., R. Chaulk, and L. N. Cluett. 1970. Length and age composition of haddock landings from the Newfoundland area by Canadian trawlers, 1953-64. Fish. Res. Board Can. Tech. Rep. 170: 69 p.

3 Hodder, V. M., and L. S. Parsons. 1970. A comparative study of herring taken at Magdalen Islands and along southwestern Newfoundland during the 1969 autumn fishery. ICNAF Res. Doc. 70/77, Ser. No. 2425. 11 p. [see ICNAF Res. Bull. 8: 59-65].

3 Hodder, V. M., and G. H. Winters. 1970. Preliminary results of herring tagging in southwestern Newfoundland, March 1970. ICNAF Res. Doc. 70/89, Ser. No. 2440. 2 p.

1 Lear, W. H. 1970. Fecundity of Greenland halibut (Reinhardtius hippoglossoides) in the Newfoundland-Labrador area. J. Fish. Res. Board Can. 27: 1880-1882.

3 Lear, W. H. 1970. Catch statistics, length, and age composition of Greenland halibut in the Newfoundland area. Fish. Res. Board Can. Tech. Rep. 179: 27 p.

3 Lear, W. H. 1970. The biology and fishery of the Greenland halibut (Reinhardtius hippoglossoides Walbaum) in the Newfoundland area. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 132 p.

3 May, A. W. 1970. Drift net tagging of Atlantic salmon. ICNAF Res. Doc. 70/2, Ser. No. 2323. 12 p. [also ICES/ICNAF Salmon Doc. 70/1].

3 May, A. W. 1970. Size and age of salmon from West Greenland, 1968 and 1969. ICNAF Res. Doc. 70/3, Ser. No. 2324. 6 p. [also ICES/ICNAF Salmon Doc. 70/2].

3 May, A. W. 1970. Canadian salmon statistics, 1917-1969. ICNAF Res. Doc. 70/4, Ser. No. 2325. 14 p. [also ICES/ICNAF Salmon Doc. 70/3].

3 May, A. W. 1970. Relative catching efficiency of salmon drift nets and relative viability of salmon caught. ICNAF Res. Doc. 70/9, Ser. No. 2330. 8 p. [also ICES/ICNAF Salmon Doc. 70/8].

1 Mercer, M. C. 1970. The tropical loliginid squid, Sepioteuthis sepioidea, from the Northwest Atlantic. J. Fish. Res. Board Can. 27: 1892-1893.

3 Mercer, M. C. 1970. Experimental transplant of the American oyster, Crassostrea virginica (Gmelin), to western Newfoundland. Fish. Res. Board Can. Tech. Rep. 188: 25 p.

3 Mercer, M. C. 1970. A. T. CAMERON Cruise 157, otter-trawl survey of the southwestern North Atlantic, February 1969. Fish. Res. Board Can. Tech. Rep. 199: 66 p.

1 Mercer, M. C. 1970. Sur la limite septentrionale du calmar Loligo pealei LeSueur. Nat. Can. (Que.) 97: 823-824.

1 Nyman, O. L. 1970. Electrophoretic analysis of hybrids between salmon (Salmo salar L.) and trout (Salmo trutta L.). Trans. Am. Fish. Soc. 99: 229-236.

3 Nyman, O. L. 1970. Origin of salmon at West Greenland. ICNAF Res. Doc. 70/5, Ser. No. 2326. 7 p. [also ICES/ICNAF Salmon Doc. 70/4].

1 Nyman, O. L. 1970. Ecological interaction of brown trout, Salmo trutta L., and brook trout, Salvelinus fontinalis (Mitchill), in a stream. Can. Field-Nat. 84: 343-350.

3 Nyman, O. L., and J.H.C. Pippy. 1970. Studies on the nematode parasites of Atlantic salmon and related species from other hosts - summary. ICNAF Res. Doc. 70/7, Ser. No. 2328. 3 p. [also ICES/ICNAF Salmon Doc. 70/6].

1 Parsons, L. S. 1970. Northern range extension of the Atlantic mackerel, Scomber scombrus, to Black Island, Labrador. J. Fish. Res. Board Can. 27: 610-613.

4 Parsons, L. S. 1970. Herring investigations in northeast Newfoundland and Labrador, p. 25-28. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 18.

1 Parsons, L. S., and V. M. Hodder. 1970. Occurrence of juvenile and spawning Atlantic mackerel in southeastern Newfoundland coastal waters. J. Fish. Res. Board Can. 27: 2097-2100.

1 Pinhorn, A. T. 1970. Assessments of the effects of increases in the mesh size of trawls on the cod fisheries in the southern Grand Bank area (ICNAF Divisions 3N and 3O). ICNAF Res. Bull. 7: 32-45.

3 Pinhorn, A. T., and R. Wells. 1970. Catch/effort assessments for the major cod stocks in ICNAF Subareas 2 and 3. ICNAF Redb. 1970(III): 65-74 [also ICNAF Res. Doc. 70/67, Ser. No. 2412].

3 Pinhorn, A. T., and R. Wells. 1970. Assessments of the effects of increases in the mesh sizes of trawls on the cod fisheries in Subareas 2 and 3. ICNAF Res. Doc. 70/68, Ser. No. 2413. 13 p. [see ICNAF Res. Bull. 8: 37-44].

3 Pinhorn, A. T., R. Wells, and T. Collier. 1970. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, of cod, haddock, redfish, American plaice, witch and yellowtail (ICNAF Subareas 3 and 4) commercial samples, 1968. In ICNAF Sampl. Yearb. 13(1).

3 Pinhorn, A. T., R. Wells, and E. Dunne. 1970. Breakdown of catch by type of gear in the Newfoundland inshore cod fishery in 1968. Fish. Res. Board Can. MS Rep. 1120: 6 p. [also ICNAF Res. Doc. 70/66, Ser. No. 2411].

1 Pippy, J.H.C. 1970. Use of ultraviolet light to find parasitic nematodes in situ. J. Fish. Res. Board Can. 27: 963-965.

4 Pippy, J.H.C. 1970. Illustrated keys to the metazoan parasites of the Salmonidae of insular Newfoundland. Fish. Res. Board Can. St. John's Biol. Sta. Circ. 17: 20 p.

3 Pippy, J.H.C. 1970. Use of fluorescence to find parasitic nematodes. ICNAF Res. Doc. 70/6, Ser. No. 2327. 5 p. [also ICES/ICNAF Salmon Doc. 70/5].

3 Pippy, J.H.C. 1970. Summary of salmon parasite investigations, 1969. ICNAF Res. Doc. 70/8, Ser. No. 2329. 10 p. [also ICES/ICNAF Salmon Doc. 70/7].

3 Pippy, J.H.C. 1970. Fish mortalities in the Northwest Miramichi River in 1969. Fish. Res. Board Can. Tech. Rep. 226: 7 p.

1 Pitt, T. K. 1970. Distribution, abundance, and spawning of yellowtail flounder, Limanda ferruginea, in the Newfoundland area of the Northwest Atlantic. J. Fish. Res. Board Can. 27: 2261-2271.

3 Pitt, T. K. 1970. Trends in the American plaice fishery in ICNAF Subarea 3. ICNAF Redb. 1970(III): 103-110 [also ICNAF Res. Doc. 70/27, Ser. No. 2420].

1 Pitt, T. K., and G. H. Winters. 1970. A record of the hatchetfish (Sternoptyx diaphana) from the Grand Bank. J. Fish. Res. Board Can. 27: 804-805.

4 Sandeman, E. J. 1970. Le Sebaste. La Peche au Canada, Oct. 1970, p. 9-11.

1 Squires, H. J. 1970. Lobster (Homarus americanus) fishery and ecology in Port au Port Bay, Newfoundland, 1960-65. Proc. Natl. Shellfish. Assoc. 60: 22-39.

1 Templeman, W. 1970. A review of the morid fish genus Lepidion of the North Atlantic with first records of Lepidion eques from the western North Atlantic. J. Fish. Res. Board Can. 27: 457-498.

1 Templeman, W. 1970. Distribution of Anotopterus pharao in the North Atlantic and comparison of specimens of A. pharao from the western North Atlantic with those from other areas. J. Fish. Res. Board Can. 27: 499-512.

1 Templeman, W. 1970. Vertebral and other meristic characteristics of Greenland halibut, Reinhardtius hippoglossoides, from the Northwest Atlantic. J. Fish. Res. Board Can. 27: 1549-1562.

3 Templeman, W. 1970. Additional tabular details of distributional, meristic and morphometric data for the paper: A review of the morid fish genus Lepidion of the North Atlantic with first records of Lepidion eques from the western North Atlantic (Templeman, 1970). Also weights, food and parasites of Lepidion. Fish. Res. Board Can. Tech. Rep. 160: 30 p.

3 Templeman, W. 1970. Additional tabular data related to the paper: Vertebral and other meristic characteristics of Greenland halibut, Reinhardtius hippoglossoides, from the Northwest Atlantic (Templeman, 1970). Fish. Res. Board Can. Tech. Rep. 192: 16 p.

3 Templeman, W. 1970. Temperatures and salinities in the eastern Newfoundland area in 1969. ICNAF Redb. 1970(III): 11-21 [also ICNAF Res. Doc. 70/36, Ser. No. 2355].

3 Templeman, W. 1970. Vertebral numbers of Greenland halibut, Reinhardtius hippoglossoides, from the Northwest Atlantic. ICES C.M.1970/F:6. 7 p.

3 Templeman, W., and J. S. Scott. 1970. Canadian research report, 1969. ICNAF Redb. 1970(II): 3-29 [also ICNAF Res. Doc. 70/10, Ser. No. 2367].

3 Wells, R., and A. T. Pinhorn. 1970. Growth and mortality changes in cod from ICNAF Subareas 2 and 3. ICNAF Res. Doc. 70/88, Ser. No. 2439. 5 p.

1 Winters, G. H. 1970. Record size and age of Atlantic capelin, Mallotus villosus. J. Fish. Res. Board Can. 27: 393-394.

1 Winters, G. H. 1970. Meristics and morphometrics of sand launce in the Newfoundland area. J. Fish. Res. Board Can. 27: 2104-2108.

1 Winters, G. H. 1970. Biological changes in coastal capelin from the over-wintering to the spawning condition. J. Fish. Res. Board Can. 27: 2215-2224.

4 Winters, G. H. 1970. Preliminary results of herring tagging in southwest Newfoundland coastal waters, p. 20-24. In Fish. Res. Board Can. St. John's Biol. Sta. Circ. 18.

PUBLICATIONS - 1971

4 Anon. 1971. [Edited by W. Templeman] Fisheries Research Board of Canada Annual Report and Investigators' Summaries - 1970. Biological Station, St. John's, Newfoundland. 76 p.

3 Ennis, G. P. 1971. Lobster (Homarus americanus) fishery and biology in Bonavista Bay, Newfoundland, 1966-70. Fish. Res. Board Can. Tech. Rep. 289: 46 p.

3 Grosslein, M. D., and A. T. Pinhorn. 1971. Progress in development of a coordinated groundfish survey program in the ICNAF area. ICNAF Res. Doc. 71/128, Ser. No. 2634. 28 p.

3 Hodder, V. M. 1971. Status of the southwest Newfoundland herring stocks, 1965-70. ICNAF Redb. 1971(III): 105-114 [also ICNAF Res. Doc. 71/121, Ser. No. 2619].

3 Hodder, V. M. 1971. Canada (Nfld.) length frequencies of herring sampled during the commercial purse-seine fishery in ICNAF Subareas 3 and 4, 1969. In ICNAF Sampl. Yearb. 14.

1 Hodder, V. M., and L. S. Parsons. 1971. Comparison of certain biological characteristics of herring from Magdalen Islands and southwestern Newfoundland. ICNAF Res. Bull. 8: 59-65.

1 Hodder, V. M., and L. S. Parsons. 1971. Some biological features of southwest Newfoundland and northern Scotian Shelf herring stocks. ICNAF Res. Bull. 8: 67-73.

3 Hodder, V. M., and L. S. Parsons. 1971. Preliminary comparison of Scotian Shelf and southwest Newfoundland herring taken during the winter of 1971. ICNAF Res. Doc. 71/120, Ser. No. 2618. 8 p.

3 Lear, W. H. 1971. Food and feeding of Atlantic salmon at sea. ICNAF Res. Doc. 71/2, Ser. No. 2487. 13 p. [also ICES/ICNAF Salmon Doc. 71/1; see ICNAF Res. Bull. 9: 27-401.

1 Lear, W. H., and A. W. May. 1971. Paralepis coregonoides borealis (Osteichythyes: Paralepididae) from the Davis Strait and Labrador Sea. J. Fish. Res. Board Can. 28: 1199-1203.

1 Lear, W. H., and J.H.C. Pippy. 1971. A record of the Atlantic menhaden (Brevoortia tyrannus) from Northumberland Strait. J. Fish. Res. Board Can. 28: 461-462.

3 Lear, W. H., and T. K. Pitt. 1971. Distribution of Greenland halibut in the Newfoundland-Labrador area in relation to depth and temperature. Fish. Res. Board Can. Tech. Rep. 274: 34 p.

2 MacCallum, W. A. 1971. Quality aspects of industrial water thawing and fillet processing, p. 225-233. In R. Kreuzer [ed.] Fish inspection and quality control. Fishing News (Books) Ltd., London.

4 May, A. W. 1971. Scientific problems relative to the West Greenland salmon fishery. Atl. Salmon J. 1: 11-13.

4 May, A. W. 1971. Overfishing the sea. Fisheries of Canada 23(5): 18-19.

3 May, A. W. 1971. Canadian tagging and recapture data for Atlantic salmon, 1959 through 1970. ICNAF Res. Doc. 71/110, Ser. No. 2593. 72 p. [also ICES/ICNAF Salmon Doc. 71/26].

3 May, A. W. 1971. Canadian drift-net fishing and tagging of Atlantic salmon in the Labrador Sea and at West Greenland in 1970. ICNAF Res. Doc. 71/66, Ser. No. 2536. 4 p. [also ICES/ICNAF Salmon Doc. 71/10].

3 May, A. W. 1971. Size and age data for Atlantic salmon from West Greenland and Canadian fisheries. ICNAF Res. Doc. 71/63, Ser. No. 2533. 3 p. (also ICES/ICNAF Salmon Doc. 71/71.

3 May, A. W., and W. H. Lear. 1971. Digest of Canadian Atlantic salmon catch statistics. Fish. Res. Board Can. Tech. Rep. 270: 106 p.

4 Mercer, M. C. 1971. Cephalopod resources and fisheries in the Northwest Atlantic. Am. Malacol. Union Inc. Annu. Rep. Bull. 1970: 30-33.

1 Miller, R. J., K. H. Mann, and D. J. Scarratt. 1971. Production potential of a seaweed-lobster community in eastern Canada. J. Fish. Res. Board Can. 28: 1733-1738.

3 Nyman, O. L., A. W. May, and A. L. Meister. 1971. Continental origin of Atlantic salmon from West Greenland and the Labrador Sea in 1970. ICNAF Res. Doc. 71/4, Ser. No. 2489. 6 p. (also ICES/ICNAF Salmon Doc. 71/31.

3 Nyman, O. L., and J.H.C. Pippy. 1971. Techniques to identify continental origin of Atlantic salmon caught at sea. ICNAF Res. Doc. 71/3, Ser. No. 2488. 21 p. (also ICES/ICNAF Salmon Doc. 71/21.

1 Nyman, O. L., and D. H. Shaw. 1971. Molecular weight heterogeneity of serum esterases in four species of salmonid fish. Comp. Biochem. Physiol. 40B: 563-566.

3 Parsons, L. S. 1971. Use of meristic and morphometric characteristics for the differentiation of Atlantic herring (Clupea harengus harengus) stocks in Newfoundland and adjacent waters. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 228 p.

3 Parsons, L. S. 1971. Use of meristic characters and a discriminant function for classifying spring- and autumn-spawning Atlantic herring. ICNAF Res. Doc. 71/107, Ser. No. 2590. 8 p. (see ICNAF Res. Bull. 9: 5-91.

1 Parsons, L. S., and V. M. Hodder. 1971. Meristic differences between spring- and autumn-spawning Atlantic herring (Clupea harengus harengus) from southwestern Newfoundland. J. Fish. Res. Board Can. 28: 553-556.

3 Parsons, L. S., and V. M. Hodder. 1971. Variation in the incidence of larval nematodes in herring from Canadian Atlantic waters. ICNAF Res. Doc. 71/6, Ser. No. 2495. 21 p. (see ICNAF Res. Bull. 8: 5-141.

1 Parsons, L. S., and V. M. Hodder. 1971. Variation in the incidence of larval nematodes in herring from Canadian Atlantic waters. ICNAF Res. Bull. 8: 5-14.

3 Pinhorn, A. T. 1971. Virtual population assessment of ICNAF Division 2J cod. ICNAF Res. Doc. 71/10, Ser. No. 2573. 16 p. (see ICNAF Res. Bull. 8: 75-851.

1 Pinhorn, A. T. 1971. Virtual population assessment of ICNAF Division 2J cod. ICNAF Res. Bull. 8: 75-85.

3 Pinhorn, A. T. 1971. Accuracy of abundance indices for cod from St. Pierre Bank (ICNAF Div. 3Ps) based on Canada (Nfld.) research vessel surveys in terms of comparisons with commercial abundance indices. ICNAF Redb. 1971 (III): 239-248 (also ICNAF Res. Doc. 71/38, Ser. No. 25281.

3 Pinhorn, A. T. 1971. Objectives and characteristics of existing and proposed groundfish surveys by the Fisheries Research Board of Canada, Biological Station, St. John's, Newfoundland. ICNAF Res. Doc. 71/36, Ser. No. 2527. 12 p.

1 Pinhorn, A. T., and R. Wells. 1971. Assessments of the effects of increases in the mesh sizes of trawls on the cod fisheries in Subareas 2 and 3. ICNAF Res. Bull. 8: 37-44.

3 Pinhorn, A. T., R. Wells, and T. Collier. 1971. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, and of cod, haddock, redfish, American plaice, witch and yellowtail (ICNAF Subareas 3 and 4) commercial samples, 1969. In ICNAF Sampl. Yearb. 14.

1 Pitt, T. K. 1971. Fecundity of the yellowtail flounder (Limanda ferruginea) from the Grand Bank, Newfoundland. J. Fish. Res. Board Can. 28: 456-457.

3 Pitt, T. K. 1971. Assessment of American plaice stocks in ICNAF Divisions 3L and 3N. ICNAF Res. Doc. 71/111, Ser. No. 2596. 13 p.

3 Pitt, T. K. 1971. A report on the tagging of Greenland halibut (Reinhardtius hippoglossoides) on the Northeast coast of Newfoundland. ICNAF Res. Doc. 71/119, Ser. No. 2613. 3 p.

3 Pitt, T. K. 1971. Age composition and estimates of total mortality for Grand Bank yellowtail flounder (Limanda ferruginea). ICNAF Res. Doc. 71/118, Ser. No. 2612. 7 p.

3 Pitt, T. K., and A. T. Pinhorn. 1971. General localities of unsuitable fishing bottom in some areas adjacent to eastern Canada. ICNAF Res. Doc. 71/112, Ser. No. 2597. 3 p.

4 Sandeman, E. J. 1971. Canadian research programs. Proc. Conference on the Canadian Shrimp Fishery. Can. Fish. Rep. 17: 25-29.

4 Sandeman, E. J. 1971. Programmes Canadiens de recherche (sur les ressources en crevettes de la côte atlantique). Actual Mar. 14(3): 20-21.

1 Shaw, D. H. 1971. Neutral carbohydrates in the milk of the bottlenose dolphin (Tursiops truncatus). Carbohydr. Res. 19: 419-422.

3 Squires, H. J., G. E. Tucker, and G. P. Ennis. 1971. Lobsters (Homarus americanus) in the Bay of Islands, Nfld., 1963-65. Fish. Res. Board Can. MS Rep. (Biol.) 1151: 58 p.

3 Templeman, W. 1971. Temperatures and salinities in the eastern Newfoundland area in 1970. ICNAF Redb. 1971(III): 5-16 (also ICNAF Res. Doc. 71/22, Ser. No. 2515).

3 Templeman, W. 1971. Summary of research and status of fisheries for Subares 2, 1970, p. 47-49. In ICNAF Annu. Proc. 21 (also ICNAF Res. Doc. 71/135, Ser. No. 2641).

3 Templeman, W., and F. D. McCracken. 1971. Canadian research report, 1970. ICNAF Redb. 1971(II): 3-26 (also ICNAF Res. Doc. 71/43, Ser. No. 2514).

1 Winters, G. H. 1971. Fecundity of the left and right ovaries of Grand Bank capelin (Mallotus villosus). J. Fish. Res. Board Can. 28: 1029-1033.

3 Winters, G. H. 1971. Migrations of the southwest Newfoundland stock of herring as indicated by tag recaptures. ICNAF Res. Doc. 71/108, Ser. No. 2591. 6 p.

3 Winters, G. H. 1971. Population estimates of the southwestern Newfoundland stock of herring from tag recaptures. ICNAF Res. Doc. 71/109, Ser. No. 2592. 7 p.

## PUBLICATIONS - 1972

4 Anon. 1972. (Edited by W. Templeman) Fisheries Research Board of Canada Annual Report and Investigators' Summaries - 1971. Biological Station, St. John's, Newfoundland. 78 p.

3 Anon. 1972. Marine Resources of Newfoundland. A background report prepared for the Provincial Fisheries Subcommittee of the Cabinet Committee on Newfoundland Resources, Province of Newfoundland and Labrador. 51 p.

1 Ennis, G. P. 1972. Growth per moult of tagged lobsters (Homarus americanus) in Bonavista Bay, Newfoundland. J. Fish. Res. Board Can. 29: 143-148.

1 Ennis, G. P. 1972. A diver-operated plankton collector. J. Fish. Res. Board Can. 29: 341-343.

1 Hodder, V. M. 1972. The fecundity of herring in some parts of the Newfoundland area. ICNAF Res. Bull. 9: 99-108.

3 Hodder, V. M., L. S. Parsons, C. I. Barbour, and R. Chaulk. 1972. Length, age and weight of herring in the southwest Newfoundland winter fishery from 1965-66 to 1970-71. Fish. Res. Board Can. Tech. Rep. 339: 113 p.

3 Hodder, V. M., L. S. Parsons, and J. H. C. Pippy. 1972. The occurrence and distribution of "red" herring in Placentia Bay, February-April 1969. Fish. Res. Board Can. ARO (Atl. Reg. Off.) Circ. 2: 45-52.

3 Hodder, V. M., and G. H. Winters. 1972. Distribution and size of larval herring and capelin, southern Gulf of St. Lawrence and southwestern Newfoundland, November 1969 and 1970. Fish. Res. Board Can. Tech. Rep. 315: 25 p.

1 Lear, W. H. 1972. Food and feeding of Atlantic salmon in coastal areas and over oceanic depths. ICNAF Res. Bull. 9: 27-40.

3 Lear, W. H. 1972. Scale characteristics of Atlantic salmon from various areas in the North Atlantic. ICES C.M.1972/M:10. 9 p.

3 Lear, W. H., and A. W. May. 1972. Size and age composition of the Newfoundland and Labrador commercial salmon catch. Fish. Res. Board Can. Tech. Rep. 353: 70 p.

3 May, A. W. 1972. Status of fisheries and research carried out in Subarea 2 in 1971. ICNAF Annu. Proc. 22: 85-86 [also ICNAF Res. Doc. 72/128, Ser. No. 2859].

3 May, A. W., and W. H. Lear. 1972. First estimates of salmon versus grilse quantities in Canadian commercial catches, 1969 and 1970. ICNAF Res. Doc. 72/69, Ser. No. 2796. 7 p. [also ICES/ICNAF Salmon Doc. 72/51.

3 May, A. W., and W. H. Lear. 1972. Gutted weight versus total length of Atlantic salmon at West Greenland. ICNAF Res. Doc. 72/93, Ser. No. 2817. 7 p. [also ICES/ICNAF Salmon Doc. 72/21; see ICNAF Res. Bull. 10: 163-166].

3 Mercer, M. C. 1972. Molluscs, p. 25-27. In Marine Resources of Newfoundland. A background report prepared for the Provincial Fisheries Subcommittee of the Cabinet Committee on Newfoundland Resources, Province of Newfoundland and Labrador.

3 Mercer, M. C. 1972. Mammals, p. 28-29. In Marine Resources of Newfoundland. A background report prepared for the Provincial Fisheries Subcommittee of the Cabinet Committee on Newfoundland Resources, Province of Newfoundland and Labrador.

3 Miller, R. J. 1972. Sea urchins, snow crabs, p. 24-25. In Marine Resources of Newfoundland. A background report prepared for the Provincial Fisheries Subcommittee of the Cabinet Committee on Newfoundland Resources, Province of Newfoundland and Labrador.

1 Miller, R. J., and K. H. Mann. 1972. Ecological energetics of the seaweed zone in a marine bay on the Atlantic coast of Canada. III. Energy transformations by sea urchins. Mar. Biol. 18: 99-114.

1 Miller, R. J., and R. B. Williams. 1972. Energy requirements and food supplies of ctenophores and jellyfish in the Patuxent River estuary. Chesapeake Sci. 13: 328-331.

1 Nyman, O. L., and J.H.C. Pippy. 1972. Differences in Atlantic salmon, Salmo salar, from North America and Europe. J. Fish. Res. Board Can. 29: 179-185.

1 Parsons, L. S. 1972. Use of meristic characters and a discriminant function for classifying spring- and autumn-spawning Atlantic herring. ICNAF Res. Bull. 9: 5-9.

3 Parsons, L. S. 1972. Meristic characteristics of Atlantic herring (Clupea harengus harengus L.) stocks in Newfoundland and adjacent waters. ICNAF Res. Doc. 72/87, Ser. No. 2790. 55 p. [see ICNAF Res. Bull. 10: 37-52].

3 Parsons, L. S., and V. M. Hodder. 1972. Offshore herring survey of the Nova Scotia banks, J. B. NICKERSON, March 1971. Fish. Res. Board Can. Tech. Rep. 291: 22 p.

3 Parsons, L. S., and V. M. Hodder. 1972. Some biological characteristics of the Fortune Bay, Newfoundland, herring stock, 1966-1971. ICNAF Res. Doc. 72/96, Ser. No. 2823. 14 p. [see ICNAF Res. Bull. 10: 15-22].

3 Parsons, L. S., and G. H. Winters. 1972. ICNAF herring otolith exchange, 1971-72. ICNAF Res. Doc. 72/92, Ser. No. 2816. 23 p.

3 Pinhorn, A. T. 1972. Virtual population assessment of ICNAF Division 3Ps cod. ICNAF Res. Doc. 72/4, Ser. No. 2683. 9 p. [see ICNAF Res. Bull. 9: 75-80].

1 Pinhorn, A. T. 1972. Virtual population assessment of St. Pierre Bank-Newfoundland south coast cod stock (ICNAF Subdivision 3Ps). ICNAF Res. Bull. 9: 75-80.

3 Pinhorn, A. T. 1972. Estimates of natural mortality for ICNAF Division 2J cod. ICNAF Res. Doc. 72/2, Ser. No. 2681. 7 p.

3 Pinhorn, A. T. 1972. Revised estimates of fishing mortality and stock size for ICNAF Division 2J cod. ICNAF Res. Doc. 72/3, Ser. No. 2682. 3 p.

3 Pinhorn, A. T. 1972. Proposed stratification scheme for ICNAF Subdiv. 3Ps. ICNAF Res. Doc. 72/60, Ser. No. 2776. 2 p.

3 Pinhorn, A. T., and T. K. Pitt. 1972. Biomass estimates for selected commercial species from stratified-random surveys in ICNAF Divisions 3L and 3N, 1971 and 3Ps, 1972. ICNAF Res. Doc. 72/110, Ser. No. 2836. 10 p.

3 Pinhorn, A. T., and R. Wells. 1972. Combined virtual population assessment for ICNAF Divisions 2J, 3K and 3L cod. ICNAF Redb. 1972(III): 35-38 [also ICNAF Res. Doc. 72/109, Ser. No. 2827].

3 Pinhorn, A. T., R. Wells, and T. Collier. 1972. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, and of cod, haddock, redfish, American plaice, witch and yellowtail (ICNAF Subareas 3 and 4) commercial samples, 1970. In ICNAF Sampl. Yearb. 15.

3 Pinhorn, A. T., R. Wells, and T. Collier. 1972. Canada (Newfoundland) length frequencies of cod (ICNAF Subarea 2) commercial and research samples, and of cod, haddock, redfish, American plaice, witch and yellowtail (ICNAF Subareas 3 and 4) commercial samples, 1971. In ICNAF Sampl. Yearb. 16.

3 Pippy, J.H.C. 1972. Summary of salmon parasite investigations 1970-71. ICNAF Res. Doc. 72/68, Ser. No. 2795. 11 p. [also ICES/ICNAF Salmon Doc. 72/4].

3 Pippy, J.H.C., V. M. Hodder, and L. S. Parsons. 1972. Symptoms of "red" herring in relation to the mass mortalities in Placentia Bay, February-April 1969. Fish. Res. Board Can. ARO (Atl. Reg. Off.) Circ. 2: 187-191.

3 Pitt, T. K. 1972. Assessment of yellowtail flounder in ICNAF Divisions 3L and 3N. ICNAF Redb. 1972(III): 73-78 [also ICNAF Res. Doc. 72/86, Ser. No. 2789].

3 Pitt, T. K. 1972. Estimates of natural mortality coefficients of American plaice. ICNAF Res. Doc. 72/15, Ser. No. 2699. 12 p.

3 Pitt, T. K. 1972. Assessment of American plaice stocks in ICNAF Divisions 3L and 3N. ICNAF Res. Doc. 72/14, Ser. No. 2698. 20 p. [see ICNAF Res. Bull. 10: 63-78].

3 Sandeman, E. J. 1972. Redfish, lobster, shrimp (Pandalus borealis), shrimp (Pandalus montagui), Cancer irroratus, p. 7-9 and 23-24. In Marine Resources of Newfoundland. A background report prepared for the Provincial Fisheries Subcommittee of the Cabinet Committee on Newfoundland Resources, Province of Newfoundland and Labrador.

3 Sandeman, E. J., and R. E. Cutting. 1972. Aquaculture - Newfoundland Regional position - biological considerations. Monograph 20888 - Fisheries Service Aquaculture Workshop, Background Documents, Hull, Quebec, August 15-17, 1972. 16 p.

3 Templeman, W. 1972. Year-class success in some North Atlantic stocks of cod and haddock. ICNAF Spec. Publ. 8: 223-239 [also ICNAF Environmental Symposium, Contrib. No. 7, 32 p.].

3 Templeman, W. 1972. Temperatures and salinities in the eastern Newfoundland area in 1971. ICNAF Redb. 1972(III): 19-26 [also ICNAF Res. Doc. 72/31, Ser. No. 2725].

3 Templeman, W., A. M. Fleming, and J. S. Scott. 1972. Canadian research report, 1971. ICNAF Redb. 1972(II): 5-18 [also ICNAF Res. Doc. 72/36, Ser. No. 2764].

3 Wells, R. 1972. Virtual population assessments of cod in ICNAF Divisions 3K and 3L. ICNAF Res. Doc. 72/16, Ser. No. 2700. 10 p.

3 Wells, R. 1972. Catch-per-haul of young cod in ICNAF Divisions 3K and 2J by the research vessel A. T. CAMERON, 1969-71. ICNAF Res. Doc. 72/108, Ser. No. 2839. 2 p.

3 Winters, G. H., and L. S. Parsons. 1972. Present status of the southwest Newfoundland herring stocks. ICNAF Res. Doc. 72/88, Ser. No. 2791. 7 p.

3 Winters, G. H., and L. S. Parsons. 1972. Inter-relationship among Hawke's Bay, southwest Newfoundland and southern Gulf of St. Lawrence herring stocks. ICNAF Res. Doc. 72/100, Ser. No. 2847. 10 p.

## PUBLICATIONS - 1973


04 Anon. 1973. [Edited by A. M. Fleming] Environment Canada, Fisheries and Marine Service Annual Report and Investigators' Summaries - 1972. Newfoundland Biological Station, St. John's, Newfoundland. 61 p.

E1 Black, R. 1973. Growth rates of intertidal molluscs as indicators of effects of unexpected incidents of pollution. J. Fish. Res. Board Can. 30: 1385-1388.

P3 Campbell, J. S., and G. H. Winters. 1973. Some biological characteristics of capelin, Mallotus villosus, in the Newfoundland area. ICNAF Redb. 1973(III): 137-144 [also ICNAF Res. Doc. 73/90, Ser. No. 3048].

P1 Ennis, G. P. 1973. Endogenous rhythmicity associated with larval hatching in the lobster Homarus gammarus. J. Mar. Biol. Assoc. U.K. 53: 531-538.

P1 Ennis, G. P. 1973. Behavioral responses to changes in hydrostatic pressure and light during larval development of the lobster (Homarus gammarus). J. Fish. Res. Board Can. 30: 1349-1360.

P1 Ennis, G. P. 1973. Food, feeding and condition of lobsters, Homarus americanus, throughout the seasonal cycle in Bonavista Bay, Newfoundland. J. Fish. Res. Board Can. 30: 1905-1909.

03 Fleming, A. M., and J. S. Scott. 1973. Canadian research report, 1972. ICNAF Redb. 1973(II): 5-14 [also ICNAF Summ. Doc. 73/14, Ser. No. 2989].

P3 Hodder, V. M., L. S. Parsons, G. H. Winters, and K. Spencer. 1973. Fat and water content of herring in Newfoundland and adjacent waters, 1966-71. Fish. Res. Board Can. Tech. Rep. 365: 49 p.

P3 Hunt, J. J., L. S. Parsons, J. E. Watson, and G. H. Winters. 1973. Report of Herring Ageing Workshop, St. Andrews, N.B., 11-13 December 1972. ICNAF Res. Doc. 73/2, Ser. No. 2901. 2 p.

F3 Lear, W. H. 1973. Size and age composition of the 1971 Newfoundland-Labrador commercial salmon catch. Fish. Res. Board Can. Tech. Rep. 392: 43 p.

F3 Lear, W. H. 1973. Distribution and relative abundance of Atlantic salmon at West Greenland and Labrador Sea during August-October 1972. ICNAF Res. Doc. 73/45, Ser. No. 2984. 7 p. [also ICES/ICNAF Salmon Doc. 73/101.

F3 Lear, W. H. 1973. Catches of species other than salmon taken by drift nets at West Greenland during 1972. ICNAF Res. Doc. 73/46, Ser. No. 2985. 7 p. [also ICES/ICNAF Salmon Doc. 73/111.

F3 Lear, W. H., and R. H. Payne. 1973. Canadian participation in the International Salmon Tagging Experiment at West Greenland. ICNAF Res. Doc. 73/47, Ser. No. 2986. 16 p. [also ICES/ICNAF Salmon Doc. 73/121.

F3 Lear, W. H., and R. H. Payne. 1973. Estimate of immediate tagging mortality of adult Atlantic salmon. ICNAF Res. Doc. 73/48, Ser. No. 2987. 5 p. [also ICES/ICNAF Salmon Doc. 73/131.

03 May, A. W. 1973. Status of fisheries and research carried out in Subarea 2 in 1972. ICNAF Annu. Rep. 23: 99-100 [also ICNAF Summ. Doc. 73/32, Ser. No. 3090].

F3 May, A. W. 1973. Distribution and migrations of salmon in the Northwest Atlantic. Int. Atl. Salmon Found. Spec. Publ. Ser. 4(1): 373-382 [also ICNAF Res. Doc. 73/57, Ser. No. 3002; also ICES/ICNAF Salmon Doc. 73/14].

F1 May, A. W., and W. H. Lear. 1973. Gutted weight versus total length of Atlantic salmon at West Greenland. ICNAF Res. Bull. 10: 163-166.

P1 Mercer, M. C. 1973. Observations on distribution and intraspecific variation in pigmentation patterns of odontocete Cetacea in the western North Atlantic. J. Fish. Res. Board Can. 30: 1111-1130.

P3 Mercer, M. C. 1973. Sexual maturity and sex ratios of the ommastrephid squid, Illex illecebrosus (LeSueur), at Newfoundland (Subarea 3). ICNAF Res. Doc. 73/71, Ser. No. 3023. 14 p.

P3 Mercer, M. C. 1973. Length-weight relationship of the ommastrephid squid Illex illecebrosus (LeSueur). ICNAF Res. Doc. 73/72, Ser. No. 3024. 2 p.

P3 Mercer, M. C. 1973. Nominal catch of squid in Canadian Atlantic waters (Subareas 2-4), 1920 to 1968. ICNAF Redb. 1973(III): 153-162 [also ICNAF Res. Doc. 73/73, Ser. No. 3025].

P3 Mercer, M. C. 1973. Distribution and biological characteristics of the ommastrephid squid, Illex illecebrosus (LeSueur) on the Grand Bank, St. Pierre Bank and Nova Scotian Shelf (Subareas 3 and 4) as determined by otter trawl surveys, 1970 to 1972. ICNAF Res. Doc. 73/79, Ser. No. 3031. 11 p.

P4 Miller, R. J., and C. A. Bishop. 1973. A sea urchin fishery for Atlantic Canada. Fish. Mar. Serv. St. John's Biol. Sta. Circ. 19: 9 p.

P3 Miller, R. J., and J. R. Hoyles. 1973. Loss of commercial snow crabs to cod gillnets in Newfoundland. Fish. Res. Board Can. Tech. Rep. 429: 21 p.

P1 Miller, R. J., and K. H. Mann. 1973. Ecological energetics of the seaweed zone in a marine bay on the Atlantic coast of Canada. III. Energy transformations by sea urchins. Mar. Biol. 18: 99-114.

P1 Parsons, L. S. 1973. Meristic characteristics of Atlantic herring, Clupea harengus harengus L., stocks in Newfoundland and adjacent waters. ICNAF Res. Bull. 10: 37-52.

P3 Parsons, L. S. 1973. Morphometric variation in Atlantic herring from Newfoundland and adjacent waters. ICNAF Res. Doc. 73/81, Ser. No. 3033. 30 p. [see ICNAF Res. Bull. 11: 73-92].

P1 Parsons, L. S., and V. M. Hodder. 1973. Some biological characteristics of the Fortune Bay, Newfoundland, herring stock, 1966-71. ICNAF Res. Bull. 10: 15-22.

P3 Parsons, L. S., and V. M. Hodder. 1973. Biological characteristics of southwest Newfoundland herring, 1965-1971. ICNAF Res. Doc. 73/29, Ser. No. 2962. 15 p. [see ICNAF Res. Bull. 11: 145-160].

P3 Parsons, L. S., and J. A. Moores. 1973. Long-distance migration of an Atlantic mackerel, Scomber scombrus, tagged in Newfoundland waters. ICNAF Res. Doc. 73/82, Ser. No. 3034. 2 p.

G3 Parsons, L. S., and D. G. Parsons. 1973. An evaluation of the status of ICNAF Divisions 3P, 3O and 3LN redfish. ICNAF Res. Doc. 73/88, Ser. No. 3042. 16 p. [see ICNAF Res. Bull. 11: 5-16].

G4 Parsons, L. S., and D. G. Parsons. 1973. Exploratory surveys for redfish off eastern Newfoundland-Labrador, CAPE FAREWELL, June-August, 1973. Background report for the Fisheries Council of Canada. 73 p.

E1 Payne, J. F., and A. K. Bal. 1973. Histochemical detection of in vitro DNA polymerase activity. Histochemistry 35: 311-317.

E1 Payne, J. F., and A. K. Bal. 1973. DNA polymerase activity in embryos of Allium cepa seed. Phytochemistry 12: 2613-2616.

E3 Payne, R. H. 1973. The use of serum transferrin polymorphism to determine the stock composition of Atlantic salmon in the West Greenland fishery. ICES C.M.1973/M:8. 7 p.

E4 Penrose, W. R. 1973. How to pollute a river and feel good about it. In R. de Villeneuve [ed.] Viewpoints: the enemy is us.

G3 Pinhorn, A. T. 1973. Comparison of mortalities calculated from virtual population assessments and from research vessel survey data for cod stocks in ICNAF Divisions 3NO and 3Ps. ICNAF Redb. 1973(III): 37-40 [also ICNAF Res. Doc. 73/3, Ser. No. 2903].

G3 Pinhorn, A. T., T. K. Pitt, and R. Wells. 1973. Estimation of numbers caught at each age for stocks of cod, American plaice and yellowtail under quota regulation in 1973. ICNAF Res. Doc. 73/89, Ser. No. 3047. 4 p.

G3 Pinhorn, A. T., and R. Wells. 1973. Virtual population assessment of the cod stock in ICNAF Divisions 3NO. ICNAF Res. Doc. 73/4, Ser. No. 2904. 4 p. [see ICNAF Res. Bull. 11: 107-110].

G3 Pinhorn, A. T., and R. Wells. 1973. Evaluation of research survey indices of abundance for cod stocks in ICNAF Subareas 2 and 3. ICNAF Redb. 1973(III): 45-50 [also ICNAF Res. Doc. 73/60, Ser. No. 3005].

F3 Pippy, J.H.C. 1973. A critical assessment of the value of Anisakis sp. (Nematoda) as a biological tag in Atlantic salmon. ICNAF Res. Doc. 73/61, Ser. No. 3008. 20 p. [also ICES/ICNAF Salmon Doc. 73/8].

FP3 Pippy, J.H.C., and L. S. Parsons. 1973. Morphology and morphometric variations of larval Anisakis sp. (Nematoda) from Atlantic salmon (Salmo salar) and Atlantic herring (Clupea harengus). ICNAF Res. Doc. 73/63, Ser. No. 3010. 19 p. [also ICES/ICNAF Salmon Doc. 73/9].

G1 Pitt, T. K. 1973. Food of American plaice (Hippoglossoides platessoides) from the Grand Bank, Newfoundland. J. Fish. Res. Board Can. 30: 1261-1273.

G1 Pitt, T. K. 1973. Assessment of American plaice stocks on the Grand Bank, ICNAF Divisions 3L and 3N. ICNAF Res. Bull. 10: 63-78.

G3 Pitt, T. K. 1973. Status of yellowtail fishery in ICNAF Divisions 3L, 3N and 3O. ICNAF Res. Doc. 73/5, Ser. No. 2905. 8 p. [with Addenda 1 and 2; see ICNAF Res. Bull. 11: 125-134].

G3 Pitt, T. K. 1973. Trends in the witch fishery in Subarea 3. ICNAF Res. Doc. 73/80, Ser. No. 3032. 7 p.

G3 Pitt, T. K. 1973. Catch per unit effort relationship in Grand Bank American plaice (ICNAF Div. 3L and 3N). ICNAF Redb. 1973(III): 71-74 [also ICNAF Res. Doc. 73/87, Ser. No. 3041].

O4 Power, H. E., and A. M. Fleming. 1973. Obituary of Wallace Allison MacCallum, 1918-1972. J. Fish. Res. Board Can. 30: 111.

P4 Sandeman, E. J. 1973. The redfish fishery of the Gulf of St. Lawrence biological considerations - past, present and future? Fish. Mar. Serv. St. John's Biol. Sta. Circ. 20: 19 p.

P4 Sandeman, E. J. 1973. Shrimps and shrimp fishing in the Atlantic Provinces. DOE, FMS Fisheries Fact Sheet No. 6: 4 p.

O1 *Templeman, W. 1973. Description and distribution of new specimens of the fish Lipogenys gillii from the western North Atlantic. J. Fish. Res. Board Can. 30: 1559-1564.

O1 *Templeman, W. 1973. First records of the gymnoblastic hydroid, Ichthyocodium sarcotretis, on the copepod, Sphyrion lumpi, from redfish of the northwest Atlantic. J. Fish. Res. Board Can. 30: 1655-1660.

O1 *Templeman, W. 1973. The skate, Raja richardsoni Garrick 1961, assigned to Bathyraja. J. Fish. Res. Board Can. 30: 1729-1732.

O1 *Templeman, W. 1973. First records, description, distribution, and notes on the biology of Bathyraja richardsoni (Garrick) from the northwest Atlantic. J. Fish. Res. Board Can. 30: 1831-1840.

O1 *Templeman, W. 1973. Distribution and abundance of the Greenland halibut, Reinhardtius hippoglossoides (Walbaum), in the Northwest Atlantic. ICNAF Res. Bull. 10: 83-98.

O2 *Templeman, W. 1973. Subarctic marine living resources. Trans. R. Soc. Can. Ser. IV, Vol. X: 259-295.

O3 *Templeman, W. 1973. Temperatures and salinities in the eastern Newfoundland area in 1972. ICNAF Redb. 1973(III): 19-26 [also ICNAF Res. Doc. 73/50, Ser. No. 3022].

G3 Wells, R. 1973. Virtual population assessment of the cod stock in ICNAF Division 3M. ICNAF Res. Doc. 73/105, Ser. No. 3068. 6 p.

G3 Wells, R. 1973. Virtual population assessment of cod in ICNAF Divisions 2GH. ICNAF Res. Doc. 73/106, Ser. No. 3069. 6 p.

P3 Winters, G. H., and V. M. Hodder. 1973. Analysis of the southern Gulf of St. Lawrence herring stock and implications concerning its future management. ICNAF Res. Doc. 73/68, Ser. No. 3015. 20 p. [see ICNAF Res. Bull. 11: 43-60].

P1 Winters, G. H., J. A. Moores, and R. Chaulk. 1973. Northern range extension and probable spawning of gaspereau (Alosa pseudoharengus) in the Newfoundland area. J. Fish. Res. Board Can. 30: 860-861.

## PUBLICATIONS - 1974

O4 Anon. 1974. [Edited by A. W. May] Environment Canada, Fisheries and Marine Service Annual Report and Investigators' Summaries - 1973. Newfoundland Biological Station, St. John's, Newfoundland. 80 p.

G1 Bishop, C. A., and W. Threlfall. 1974. Helminth parasites of the common elder duck, Somateria mollissima (L.), in Newfoundland and Labrador. Proc. Helminthol. Soc. Wash. 41: 25-35.

E1 Black, R. 1974. Some biological interactions affecting intertidal populations of the kelp Egregia laevigata. Mar. Biol. 28(3): 189-198.

G3 Bowering, W. R., and T. K. Pitt. 1974. An assesment of witch (Glyptocephalus cynoglossus) for ICNAF Divisions 2J-3KL. ICNAF Res. Doc. 74/48, Ser. No. 3255. 7 p.

P3 Campbell, J. S. 1974. Possible biological characteristics for separation of capelin stocks (Mallotus villosus) in the Newfoundland-Labrador area. ICNAF Res. Doc. 74/11, Ser. No. 3157. 8 p.

P4 Campbell, J. S. 1974. Some characteristics of inshore spawning capelin, Appendix 7. In A. Duthie [ed.] The Capelin Story 1973. Industrial Development Branch, Fisheries and Marine Service, St. John's, Newfoundland.

F3 Christensen, O., and W. H. Lear. 1974. Distribution and abundance of salmon at West Greenland. ICNAF Res. Doc. 74/43, Ser. No. 3229. 23 p. [also ICES/ICNAF Salmon Doc. 74/16].

F3 Christensen, O., and W. H. Lear. 1974. By-catches in salmon drift nets at West Greenland in 1972. ICNAF Res. Doc. 74/44, Ser. No. 3230. 27 p. [also ICES/ICNAF Salmon Doc. 74/17].

E4 Duthie, A., and D. H. Shaw. 1974. Impressions of the Icelandic capelin fishery, Appendix 6. In A. Duthie [ed.] The Capelin Story 1973. Industrial Development Branch, Fisheries and Marine Service, St. John's, Newfoundland.

P3 Ennis, G. P. 1974. Observations on the lobster fishery in Newfoundland. Fish. Res. Board Can. Tech. Rep. 479: 21 p.

P3 Ennis, G. P. 1974. Comparison of larval behavior and hatching in European and American lobsters. Ph.D. thesis, Univ. Liverpool, Liverpool, Eng.

G1 Khan, R. A., and T. K. Pitt. 1974. An infestation of the marine fish Lycodes lavalaei by the parasitic copepod Tanypleurus alcicornis. J. Fish. Res. Board Can. 31: 470-471.

F3 Lear, W. H. 1974. Evaluation of the transplant of Pacific pink salmon (Oncorhynchus gorbuscha) to Newfoundland. ICES C.M.1974/M:7. 22 p.

F3 Lear, W. H., R. F. Burfitt, and W. N. Batten. 1974. Seasonal trends in the biological characteristics of Atlantic salmon in the commercial marine fishery at Bonavista, Newfoundland. Fish. Res. Board Can. Tech. Rep. 477: 43 p.

F3 Lear, W. H., and O. Christensen. 1974. Selectivity and relative efficiency of salmon drift nets. ICNAF Res. Doc. 74/41, Ser. No. 3227. 9 p. [also ICES/ICNAF Salmon Doc. 74/12].

F3 Lear, W. H., and O. Christensen. 1974. Bycatches of harbour porpoise (Phocoena phocoena) in salmon drift-nets at West Greenland in 1972. Subcommittee on Small Cetacea of the Scientific Committee of the International Whaling Commission, Montreal, April 1-12, 1974. Doc. M7. 11 p.

FP3 Lear, W. H., and E. J. Sandeman. 1974. Use of scale characters and a discriminant function for identifying continental origin of Atlantic salmon. ICNAF Res. Doc. 74/40, Ser. No. 3226. 12 p. [also ICES/ICNAF Salmon Doc. 74/11].

03 May, A. W. 1974. Status of fisheries and research carried out in Subarea 2 in 1973. ICNAF Annu. Rep. 24: 119-121 [also ICNAF Summ. Doc. 74/42, Ser. No. 3362].

03 May, A. W. 1974. Underexploited species in the Canadian Atlantic, p. 51-55. In Proc. Government-Industry Meeting on the Utilization of Atlantic Marine Resources, Feb. 5-7, 1974, Montreal, P.Q.

03 May, A. W., and J. S. Scott. 1974. Canadian research report, 1973. ICNAF Summ. Doc. 74/21, Ser. No. 3272. 11 p.

P3 Mercer, M. C. 1974. Natural mortality of the Iceland scallop (Chlamys islandicus) in the Gulf of St. Lawrence. ICES C.M.1974/K:7. 11 p.

P3 Mercer, M. C. 1974. Modified Leslie-DeLury assessments of the northern pilot whale (Globicephala melaena) and annual production of the short-finned squid (Illex illecebrosus) based upon their interaction at Newfoundland. ICNAF Res. Doc. 74/49, Ser. No. 3256. 14 p.

P3 Mercer, M. C., and G. Paulmier. 1974. Distribution and biological characteristics of the short-finned squid (Illex illecebrosus) on the continental shelf of Subareas 3 and 4 in May-June 1973. ICNAF Res. Doc. 74/67, Ser. No. 3323. 11 p.

P3 Mercer, M. C. 1974. The interaction between the northern pilot whale (Globicephala melaena) and the short-finned squid (Illex illecebrosus) at Newfoundland with particular reference to stock assessments and production estimates. Subcommittee on Small Cetacea of the Scientific Committee of the International Whaling Commission, Montreal, April 1-12, 1974. Doc. MB. 19 p.

P3 Mercer, M. C. 1974. Status of whale stocks fished at Newfoundland. Subcommittee on Small Cetacea of the Scientific Committee of the International Whaling Commission, Montreal, April 1-12, 1974. Doc. M27. 19 p.

P1 Miller, R. J. 1974. Distribution and biomass of an estuarine ctenophore population, Mnemiopsis leidyi (A. Agassiz). Chesapeake Sci. 15: 1-8.

PG3 Moores, J. A., G. H. Winters, and L. S. Parsons. 1974. Some biological characteristics of mackerel (Scomber scombrus) in Newfoundland waters. ICNAF Res. Doc. 74/8, Ser. No. 3154. 18 p.

GP3 Parsons, L. S., M. C. Mercer, R. Wells, and J. S. Campbell. 1974. Distribution, abundance and biology of some underexploited Northwest Atlantic finfish and shellfish, p. 107-138. In Proc. Government-Industry Meeting on the Utilization of Atlantic Marine Resources, Feb. 5-7, 1974, Montreal, P.Q.

P1 Parsons, L. S., and J. A. Moores. 1974. Long-distance migration of an Atlantic mackerel (Scomber scombrus). J. Fish. Res. Board Can. 31: 1521-1522.

G3 Parsons, L. S., and D. G. Parsons. 1974. Exploratory surveys for redfish off eastern Newfoundland-Labrador, CAPE FAREWELL, June-August 1973. Fish. Res. Board Can. Tech. Rep. 433: 73 p.

G3 Parsons, L. S., and D. G. Parsons. 1974. An evaluation of the status of Flemish Cap redfish. ICNAF Res. Doc. 74/78, Ser. No. 3311. 18 p.

G3 Parsons, L. S., and D. G. Parsons. 1974. Some observations on Subarea 2 + Division 3K, Divisions 3L-N and Division 3O redfish. ICNAF Res. Doc. 74/79, Ser. No. 3312. 16 p.

G3 Parsons, L. S., and D. G. Parsons. 1974. Yield per recruit assessment of ICNAF Division 3P redfish. ICNAF Res. Doc. 74/80, Ser. No. 3313. 11 p.

E1 Payne, J. F., and A. K. Bal. 1974. Histochemical detection of nucleotide phosphodiesterase activity in germinating onion seed. Plant Sci. Lett. 2: 319-330.

F1 Payne, R. H. 1974. Transferrin variation in North American populations of the Atlantic salmon, Salmo salar. J. Fish. Res. Board Can. 31: 1037-1041.

F3 Payne, R. H. 1974. The use of serum transferrin polymorphism to determine the stock composition of Atlantic salmon in the West Greenland fishery. ICES/ICNAF Salmon Doc. 74/14. 9 p.

E2 Penrose, W. R. 1974. Arsenic in marine and aquatic environments: analysis, occurrence and significance. CRC Crit. Rev. Environ. Control 4: 465-482.

E3 Penrose, W. R., R. Black, and J. F. Payne. 1974. Effects of the large-capacity refinery on the living resources of Come by Chance Bay. Report on Task 6 of the Come by Chance Environmental Design Criteria Study. 19 p.

G3 Pinhorn, A. T. 1974. Preliminary estimates of sustainable yield for roundnose grenadier (Macrourus rupestris) in ICNAF Subareas 2 and 3. ICNAF Res. Doc. 74/6, Ser. No. 3149. 5 p.

G3 Pinhorn, A. T. 1974. Description of fisheries and sampling schemes for Canada (Nfld.), p. 7-10. In ICNAF Summ. Doc. 74/35, Ser. No. 3344.

G3 Pinhorn, A. T., and R. G. Halliday. 1974. Bibliography of age validation studies with comments on ageing problems for stocks of commercial importance in ICNAF Subareas 2-4. ICNAF Res. Doc. 74/111, Ser. No. 3349. 6 p.

G3 Pinhorn, A. T., and L. S. Parsons. 1974. Status of the redfish fishery in ICNAF Subarea 2 and Division 3K. ICNAF Res. Doc. 74/5, Ser. No. 3148. 5 p.

G3 Pinhorn, A. T., and T. K. Pitt. 1974. Results of groundfish surveys on Grand Bank and St. Pierre Bank, 1971-73. ICNAF Res. Doc. 74/75, Ser. No. 3308. 14 p.

G3 Pinhorn, A. T., and R. Wells. 1974. Calculation of total allowable catches (TAC's) for 1975 for cod stocks in Subareas 2 and 3. ICNAF Res. Doc. 74/89, Ser. No. 3325. 16 p.

F3 Pippy, J.H.C. 1974. The value of parasites as biological tags in Atlantic salmon at West Greenland. ICNAF Res. Doc. 74/42, Ser. No. 3228. 9 p. (also ICES/ICNAF Salmon Doc. 74/13).

F3 Pippy, J.H.C., and P. van Banning. 1974. Identification of Anisakis larva (I) as Anisakis simplex (Rud., 1809, det. Krabbe, 1878) (Nematoda: Ascaridata). ICNAF Res. Doc. 74/47, Ser. No. 3253. 5 p.

G1 Pitt, T. K. 1974. Age composition and growth of yellowtail flounder (Limanda ferruginea) from the Grand Bank. J. Fish. Res. Board Can. 31: 1800-1802.

G3 Pitt, T. K. 1974. The Greenland halibut fishery in Subarea 2 and Divisions 3K and 3L. ICNAF Res. Doc. 74/2, Ser. No. 3144. 4 p.

G3 Pitt, T. K. 1974. Status of the American plaice fishery in Subarea 2-Division 3K, Division 3M and Subdivision 3Ps. ICNAF Res. Doc. 74/3, Ser. No. 3145. 3 p.

G3 Pitt, T. K. 1974. Assessment of American plaice from Subarea 2 and Division 3K. ICNAF Res. Doc. 74/69, Ser. No. 3299. 6 p.

G3 Pitt, T. K. 1974. Updated estimates of total allowable catches of several flatfish stocks for Subareas 2 and 3. ICNAF Res. Doc. 74/73, Ser. No. 3306. 10 p.

P4 Sandeman, E. J. 1974. Offshore renewable resources and their management. Can. Ship. Mar. Engineer. 45(7): 29-31.

P3 Sandeman, E. J. 1974. Focus on fisheries, p. 101-110. In Proc. Can. Soc. Zool. Annu. Meet., Fredericton, N.B.

E4 Shaw, D. H., and J. R. Botta. 1974. Observations and recommendations on pre-processing handling of inshore capelin, Appendix B. In A. Duthie [ed.] The Capelin Story 1973. Industrial Development Branch, Fisheries and Marine Service, St. John's, Newfoundland.

P1 Squires, H. J., G. P. Ennis, and G. E. Tucker. 1974. Lobsters of the northwest coast of Newfoundland, 1964-67. Proc. Natl. Shellfish. Assoc. 64: 16-27.

O1 *Templeman, W. 1974. Migrations and intermingling of Atlantic cod (Gadus morhua) stocks of the Newfoundland area. J. Fish. Res. Board Can. 31: 1073-1092.

O3 *Templeman, W. 1974. Temperatures and salinities in the eastern Newfoundland area in 1973. ICNAF Res. Doc. 74/71, Ser. No. 3304. 13 p.

G3 Wells, R. 1974. Some notes on the Labrador-Northeast Newfoundland cod stock with special reference to the inshore fisheries. ICNAF Res. Doc. 74/103, Ser. No. 3339. 15 p.

G3 Wells, R., and A. T. Pinhorn. 1974. Some implications of closure of Hamilton Inlet Bank to the commercial cod fishery during the spawning season. ICNAF Res. Doc. 74/104, Ser. No. 3340. 7 p.

P3 Winters, G. H. 1974. Back-calculation of the growth of capelin (Mallotus villosus) in the Newfoundland area. ICNAF Res. Doc. 74/7, Ser. No. 3150. 16 p.

P3 Winters, G. H. 1974. Rationale for partition of capelin quota in Subareas 2 and 3. ICNAF Res. Doc. 74/12, Ser. No. 3158. 3 p.

P3 Winters, G. H. 1974. Supplementary report on ICNAF Herring Otolith Exchange, 1971-72 (ICNAF Res. Doc. 72/92). ICNAF Res. Doc. 74/77, Ser. No. 3310. 16 p.

P3 Winters, G. H., and J. S. Campbell. 1974. Some biological aspects and population parameters of Grand Bank capelin. ICNAF Res. Doc. 74/76, Ser. No. 3309. 23 p.

PUBLICATIONS - 1975

O4 Anon. 1975. Environment Canada, Fisheries and Marine Service Annual Report - 1974. Newfoundland Biological Station, St. John's, Newfoundland. 23 p.

E1 Botta, J. R., and D. H. Shaw. 1975. Chemical and sensory analysis of roughhead grenadier (Macrourus berglax) stored in ice. J. Food Sci. 40: 1249-1252.

G3 Bowering, W. R. 1975. Length-weight relationship in witch (Glyptocephalus cynoglossus) in the Newfoundland area of the Northwest Atlantic. ICNAF Res. Doc. 75/25, Ser. No. 3480. 4 p. (see ICNAF Res. Bull. 12: 135-136).

G3 Bowering, W. R., and T. K. Pitt. 1975. Yield per recruit assessment of witch (Glyptocephalus cynoglossus) for ICNAF Divisions 3N and 3O. ICNAF Res. Doc. 75/23, Ser. No. 3478. 5 p.

G3 Bowering, W. R., and T. K. Pitt. 1975. Yield per recruit assessment of Greenland halibut (Reinhardtius hippoglossoides), ICNAF Subarea 2 and Divisions 3K and 3L. ICNAF Res. Doc. 75/24, Ser. No. 3479. 7 p.

F3 Cross, T. F., and R. H. Payne. 1975. A preliminary study of some enzyme polymorphisms of potential value for cod stock identification off eastern North America. ICES C.M.1975/F:22. 8 p.

E3 Dawe, L. L. 1975. Investigations into the factors contributing to the decline of coliform bacterial populations in sea-water. B.Sc. Hons. thesis, Memorial Univ. Newfoundland, St. John's, Nfld.

P1 Ennis, G. P. 1975. Behavioral responses to changes in hydrostatic pressure and light during larval development of the lobster Homarus americanus. J. Fish. Res. Board Can. 32: 271-281.

P1 Ennis, G. P. 1975. Observations on hatching and larval release in the American lobster Homarus americanus. J. Fish. Res. Board Can. 32: 2210-2213.

G4 Halliday, R. G., and A. T. Pinhorn. 1975. Some observations on the Theory of Fishing. Lunenburg Progress Enterprise, September 10, p. 8-9.

F1 Lear, W. H. 1975. Evaluation of the transplant of Pacific pink salmon (Oncorhynchus gorbuscha) from British Columbia to Newfoundland. J. Fish. Res. Board Can. 32: 2345-2356.

F3 Lear, W. H. 1975. Trawl caught Atlantic salmon on the Canadian continental shelf. ICES C.M.1975/M:4. 7 p.

F1 Lear, W. H., and O. Christensen. 1975. By-catches of harbour porpoise (Phocoena phocoena) in salmon driftnets at West Greenland in 1972. J. Fish. Res. Board Can. 32: 1225-1228.

F3 Lear, W. H., and R. H. Payne. 1975. A comparison of scale analysis and serum electrophoresis as methods of determining the stock composition of Atlantic salmon off West Greenland in 1974. ICES C.M.1975/M:5. 7 p.

FG1 Lear, W. H., and T. K. Pitt. 1975. Otolith age validation of Greenland halibut (Reinhardtius hippoglossoides). J. Fish. Res. Board Can. 32: 289-292.

G3 Lopez-Veiga, E. C., R. G. Halliday, and R. Wells. 1975. Results of the Canada-Spain cod otolith exchange. ICNAF Res. Doc. 75/73, Ser. No. 3557. 4 p.

O3 May, A. W., and J. S. Scott. 1975. Canadian research report, 1974. ICNAF Summ. Doc. 75/15, Ser. No. 3487. 12 p.

P1 Mercer, M. C. 1975. Modified Leslie-DeLury population models of the long-finned pilot whale (Globicephala melaena) and annual production of the short-finned squid (Illex illecebrosus) based upon their interaction at Newfoundland. J. Fish. Res. Board Can. 32: 1145-1154.

P3 Mercer, M. C. 1975. Size and maturity of the ommastrephid squid, Illex illecebrosus (LeSueur), at Newfoundland. ICES C.M.1975/K:50. 28 p.

P3 Mercer, M. C. 1975. Size distribution of the migrant ommastrephid squid, Illex illecebrosus (LeSueur), in Newfoundland inshore waters. ICNAF Res. Doc. 75/27, Ser. No. 3482. 13 p.

P1 Miller, R. J. 1975. Density of the commercial spider crab, Chionoecetes opilio, and calibration of effective area fished per trap using bottom photography. J. Fish. Res. Board Can. 32: 761-768.

P3 Miller, R. J. 1975. Resource waste by fishermen in a Newfoundland spider crab fishery. ICES C.M.1975/K:40. 8 p.

E1 Misra, R. K. 1975. Multivariate analysis for hybridization. Biom. Z. 17: 181-188.

PG1 Moores, J. A., G. H. Winters, and L. S. Parsons. 1975. Migrations and biological characteristics of Atlantic mackerel (Scomber scombrus) occurring in Newfoundland waters. J. Fish. Res. Board Can. 32: 1347-1357.

P3 Naidu, K. S. 1975. Growth and population structure of a northern shallow-water population of the giant scallop, Placopecten magellanicus (Gmelin). ICES C.M.1975/K:37. 17 p.

G1 Parsons, L. S. 1975. Morphometric variation in Atlantic herring from Newfoundland and adjacent waters. ICNAF Res. Bull. 11: 73-92.

GP1 Parsons, L. S., and V. M. Hodder. 1975. Biological characteristics of southwest Newfoundland herring, 1965-71. ICNAF Res. Bull. 11: 145-160.

G1 Parsons, L. S., and D. G. Parsons. 1975. An evaluation of the status of ICNAF Divisions 3P, 3O and 3LN redfish. ICNAF Res. Bull. 11: 5-16.

G3 Parsons, L. S., and D. G. Parsons. 1975. Status of Division 3P redfish. ICNAF Res. Doc. 75/137, Ser. No. 3690. 12 p.

E3 Payne, J. F. 1975. Cytological study of some chromatin bound enzymes by in vitro autoxodiology. Ph.D thesis, Memorial Univ. Newfoundland, St. John's, Newfoundland. 200 p.

E1 Payne, J. F., and W. R. Penrose. 1975. Induction of aryl hydrocarbon (benzo[a]pyrene) hydroxylase in fish by petroleum. Bull. Environ. Contam. Toxicol. 14: 112-116.

E4 Payne, J. F., and W. R. Penrose. 1975. Petroleum induction of benzo[a]pyrene hydroxylase in marine organisms [Abstract]. Proc. Can. Fed. Biol. Soc. 18: 56.

F3 Payne, R. H. 1975. Esterase polymorphism in the capelin, Mallotus villosus: preliminary evidence for geographic variation in allele frequencies at three loci. ICES C.M.1975/H:28. 9 p.

E1 Penrose, W. R. 1975. Biosynthesis of organic arsenic compounds in brown trout (Salmo trutta). J. Fish. Res. Board Can. 32: 2385-2390.

E1 Penrose, W. R., R. Black, and M. J. Hayward. 1975. Limited arsenic dispersion in sea water, sediments, and biota near a continuous source. J. Fish. Res. Board Can. 32: 1275-1281.

G1 Pinhorn, A. T. 1975. Estimates of natural mortality for the cod stock complex in ICNAF Divisions 2J, 3K and 3L. ICNAF Res. Bull. 11: 31-36.

G3 Pinhorn, A. T. 1975. Status of fisheries and research carried out in Subarea 2 in 1974. ICNAF Annu. Rep. 25: 105 [also ICNAF Summ. Doc. 75/40, Ser. No. 3618].

G3 Pinhorn, A. T., and R. G. Halliday. 1975. Resources 1975 - current status of Atlantic offshore groundfish stocks and fisheries. Fish. Mar. Serv. Res. Dev. Tech. Rep. 526: 49 p.

G1 Pinhorn, A. T., and R. Wells. 1975. Virtual population assessment of the southern Grand Bank cod stock (ICNAF Divisions 3N and 3O). ICNAF Res. Bull. 11: 107-110.

F3 Pippy, J.H.C. 1975. Larval Anisakis simplex in Atlantic salmon Salmo salar and their value as biological indicators. Ph.D. thesis, Univ. Guelph, Guelph, Ont. 118 p.

F1 Pippy, J.H.C., and P. van Banning. 1975. Identification of Anisakis larva (I) as Anisakis simplex (Rudolphi, 1809, det. Krabbe 1878) (Nematoda: Ascaridata). J. Fish. Res. Board Can. 32: 29-32.

G1 Pitt, T. K. 1975. Changes in abundance and certain biological characteristics of Grand Bank American plaice, Hippoglossoides platessoides. J. Fish. Res. Board Can. 32: 1383-1398.

G1 Pitt, T. K. 1975. Status of the yellowtail flounder fishery in ICNAF Divisions 3L, 3N and 3O. ICNAF Res. Bull. 11: 125-134.

G3 Pitt, T. K. 1975. An assessment of American plaice in ICNAF Subdivision 3Ps. ICNAF Res. Doc. 75/22, Ser. No. 3477. 4 p.

G3 Pitt, T. K. 1975. Possible effects of non-reported discards of flatfish on TAC of plaice and yellowtail in ICNAF Divisions 3LNO. ICNAF Res. Doc. 75/28, Ser. No. 3483. 10 p.

G3 Pitt, T. K. 1975. The delineation of American plaice stocks with special reference to ICNAF Divisions 3LNO. ICNAF Res. Doc. 75/52, Ser. No. 3531. 10 p.

E1 Shaw, D. H., and J. R. Botta. 1975. Preservation studies of inshore male capelin (Mallotus villosus) stored in ice. J. Fish. Res. Board Can. 32: 2039-2046.

E1 Shaw, D. H., and J. R. Botta. 1975. Preservation of inshore male capelin (Mallotus villosus) stored in refrigerated sea water. J. Fish. Res. Board Can. 32: 2047-2053.

03 *Templeman, W. 1975. Comparison of temperatures in July-August hydrographic sections of the eastern Newfoundland area in 1972 and 1973 with those from 1951 to 1971. ICNAF Spec. Publ. 10: 17-32.

03 *Templeman, W. 1975. Biological and oceanographic background of Flemish Cap as an area for research on the reasons for year-class success and failure in cod and redfish. ICNAF Res. Doc. 75/97, Ser. No. 3580. 52 p. [see ICNAF Res. Bull. 12: 91-118].

P3 Winters, G. H. 1975. Estimates of tag extrusion and initial tagging mortality in an internal tagging experiment. ICES C.M.1975/H:27. 14 p.

P3 Winters, G. H. 1975. Review of capelin ecology and estimation of surplus yield from predator dynamics. ICNAF Res. Doc. 75/2, Ser. No. 3430. 25 p.

P3 Winters, G. H. 1975. Population dynamics of the southern Gulf of St. Lawrence herring stock complex and implications concerning its future management. Ph.D. thesis, Dalhousie Univ., Halifax, N.S. 142 p.

P1 Winters, G. H., and V. M. Hodder. 1975. Analysis of the southern Gulf of St. Lawrence herring stock and implications concerning its future management. ICNAF Res. Bull. 11: 43-60.


## PUBLICATIONS - 1976


E3 Akenhead, S. A. 1976. The ICNAF sampling program: need for standardized guidelines. ICNAF Summ Doc. 76/27, Ser. No. 3878. 8 p.

E3 Akenhead, S. A. 1976. Adequacy of sampling for TAC stocks, 1974. ICNAF Summ. Doc. 76/33, Ser. No. 3918. 13 p.

04 Anon. 1976. Environment Canada, Fisheries and Marine Service Annual Report - 1975. Research and Resource Services, St. John's, Newfoundland. 25 p.

G3 Bishop, C. A. 1976. Some results of a Spanish pair trawling experiment in ICNAF Subarea 3 with observations on pair trawling of the main Spanish fleet. Fish. Mar. Serv. Res. Dev. Tech. Rep. 596: 16 p.

E1 Black, R. 1976. The effects of grazing by the limpet, Acmaea insessa, on the kelp, Egregia laevigata, in the intertidal zone. Ecology 57: 265-277.

E1 Botta, J. R., and D. H. Shaw. 1976. Chemical and sensory analysis of roundnose grenadier (Coryphaenoides rupestris) stored in ice. J. Food Sci. 41: 1285-1288.

G1 Bowering, W. R. 1976. Distribution, age and growth, and sexual maturity of witch flounder (Glyptocephalus cynoglossus) in Newfoundland waters. J. Fish. Res. Board Can. 33: 1574-1584.

G1 Bowering, W. R. 1976. Length-weight relationships in witch flounder, Glyptocephalus cynoglossus, in the Newfoundland area. ICNAF Res. Bull. 12: 135-136.

F3 Bruce, W. J. 1976. Age, growth, maturity and food habits of landlocked salmon (Salmo salar) in Soldiers Pond, a Newfoundland lake. Fish. Mar. Serv. Res. Dev. Tech. Rep. 668: 16 p.

F3 Bruce, W. J., and R. F. Parsons. 1976. Age, growth and maturity of lake chub (Couesius plumbeus) in Mile 66 Brook, Ten Mile Lake, western Labrador. Fish. Mar. Serv. Res. Dev. Tech. Rep. 683: 13 p.

P3 Carscadden, J. 1976. Biological characteristics of capelin (Mallotus villosus) from Div. 3K and 2J in November 1975. ICNAF Res. Doc. 76/62, Ser. No. 3849. 5 p.

P3 Carscadden, J. 1976. Capelin (Mallotus villosus) research in the ICNAF Area, 1973-76. ICNAF Res. Doc. 76/120, Ser. No. 3953. 6 p.

P3 Chan, M., and J. Carscadden. 1976. The food and feeding of capelin (Mallotus villosus) in the Labrador area during autumn 1973. ICNAF Res. Doc. 76/20, Ser. No. 3800. 5 p.

F3 Coady, L. W., and C. W. Best. 1976. Biological and management investigations of the Arctic char fishery at Nain, Labrador. Fish. Mar. Serv. Res. Dev. Tech. Rep. 624: 103 p.

F3 Cross, T. F., and R. H. Payne. 1976. The use of protein polymorphism to distinguish cod stocks. ICES C.M.1976/F:25. 23 p.

E1 Driedzic, W. R., and J. W. Kiceniuk. 1976. Blood lactate levels in free-swimming rainbow trout (Salmo gairdneri) before and after strenuous exercise resulting in fatigue. J. Fish. Res. Board Can. 33: 175-176.

P3 Ennis, G. P. 1976. Estimates of abundance and recruitment to the standing stock for a Newfoundland population of the lobster, Homarus americanus, with a method of estimating its natural mortality. ICES Special Meeting on Population Assessment of Shellfish Stocks 1976/9. 7 p.

P3 Ennis, G. P. 1976. Determination of shell condition in lobsters (Homarus americanus) by means of external macroscopic examination. ICES C.M.1976/K:28. 5 p.

F1 Farwell, M. K., J. M. Green, and V. A. Pepper. 1976. Distribution and known life history of Stictaeus punctatus in the Northwest Atlantic. Copeia 3: 598-602.

F3 Farwell, M. K., and T. R. Porter. 1976. Atlantic salmon enhancement techniques in Newfoundland. FAO Tech. Conf. on Aquaculture, Kyoto, Japan. FIR:AQ/Conf/76/E.31. 8 p.

03 Fleming, A. M., and J. S. Scott. 1976. Canadian research report, 1975. ICNAF Summ. Doc. 76/23, Ser. No. 3866. 12 p.

P1 Gabriel, W. L., W. C. Leggett, J. E. Carscadden, and B. D. Glebe. 1976. Origin and characteristics of "fall run" American shad (Alosa sapidissima) from the St. John River, New Brunswick. J. Fish. Res. Board Can. 33. 1764-1770.

03 *Jones, J. B. 1976. Development strategy for Labrador's native population: the case for commercial fishing. M.A. thesis, Univ. Alberta, Edmonton, Alberta. 93 p.

E1 Kennedy, V. S. 1976. Arsenic concentrations in some coexisting marine organisms from Newfoundland and Labrador. J. Fish. Res. Board Can. 33: 1388-1393.

F1 Lear, W. H. 1976. Migrating Atlantic salmon (Salmo salar) caught by otter trawl on the Newfoundland continental shelf. J. Fish. Res. Board Can. 33: 1202-1205.

F2 Lear, W. H. 1976. Anadromous fish (Atlantic salmon, pink salmon, trout), p. 34-37. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

F3 Lear, W. H., W. N. Batten, and R. F. Burfitt. 1976. Seasonal trends in the biological characteristics of Atlantic salmon from three selected areas along the southeast and northeast Newfoundland coasts. Fish. Mar. Serv. Res. Dev. Tech. Rep. 601: 75 p.

P3 Leggett, W., J. Sharp, K. Able, and J. Carscadden. 1976. Meristic and morphometric evidence for separate stocks of capelin (Mallotus villosus) in Canadian waters. ICES C.M.1976/H:42. 18 p.

P3 McKone, W. D., and G. H. Winters. 1976. A preliminary report of the comparison of herring tagged with six types of tags. ICNAF Res. Doc. 76/19, Ser. No. 3799. 4 p.

P2 Mercer, M. C. 1976. Molluscs, p. 41-45, and mammals, p. 46-51. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

P3 Mesnil, B., M. C. Mercer, and P. W. Collins. 1976. Report of R/V CRYOS squid surveys, May 3-19 and November 22-December 15, 1975. ICNAF Res. Doc. 76/87, Ser. No. 3900. 12 p.

P2 Miller, R. J. 1976. Crustaceans (rock crab, toad crab, snow crab) and echinoderms (sea urchin), p. 39-41. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

P1 Miller, R. J. 1976. North American crab fisheries: regulations and their rationales. Fish. Bull. 74: 623-633.

P3 Miller, R. J. 1976. Trap mesh selection and catches of the spider crab, Chionoecetes opilio. Fish. Mar. Serv. Res. Dev. Tech. Rep. 598: 15 p.

P1 Miller, R. J., and J. Watson. 1976. Growth per molt and limb regeneration in the spider crab, Chionoecetes opilio. J. Fish. Res. Board Can. 33: 1644-1649.

E1 Misra, R. K. 1976. Multivariate analysis for hybridization among organisms of unequal ages. Biom. Z. 18: 313-318.

P3 Moores, J. A. 1976. Mackerel research in the Newfoundland area during 1975. ICNAF Res. Doc. 76/18, Ser. No. 3798. 10 p.

P3 Moores, J. A. 1976. A preliminary analysis of mackerel sampled in Newfoundland during 1976. ICNAF Res. Doc. 76/161, Ser. No. 4057. 3 p.

F3 Moores, R. B. 1976. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1975. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-76-1: 297 p.

F3 Morry, C. 1976. Angled catch and effort statistics for Murray's and Butler's Ponds (1944-1974). Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-76-2: 40 p.

P3 Naidu, K. S., and R. Scapien. 1976. Settlement and survival of the giant scallop, Placopecten magellanicus, larvae on enclosed polyethylene film collectors. FAO Tech. Conf. on Aquaculture, Kyoto, Japan. FIR:AQ/Conf/76/E.7. 5 p.

G2 Parsons, L. S. 1976. Groundfish (redfish, skates, grenadiers, blue hake), p. 5-27. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

G3 Parsons, L. S. 1976. Distribution and relative abundance of roundnose, roughhead and common grenadiers in the Northwest Atlantic. ICNAF Sel. Pap. 1: 73-88 [also ICNAF Res. Doc. 75/26, Ser. No. 3481, and ICES C.M.1975/F:21].

G3 Parsons, L. S., and D. G. Parsons. 1976. Effects of diurnal variation in availability upon estimation of redfish numbers and biomass from stratified-random bottom trawl surveys. ICNAF Sel. Pap. 1: 19-30 [also ICNAF Res. Doc. 75/45, Ser. No. 3524].

G1 Parsons, L. S., A. T. Pinhorn, and D. G. Parsons. 1976. An evaluation of the northern Newfoundland-Labrador and Flemish Cap redfish fisheries. ICNAF Res. Bull. 12: 37-48.

GP2 Parsons, L. S., and G. H. Winters. 1976. Pelagic fish (Atlantic mackerel), p. 30-31. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

E1 Payne, J. F. 1976. Field evaluation of benzopyrene hydroxylase induction as a monitor for marine petroleum pollution. Science 191: 945-946.

E4 Payne, J. F. 1976. Benzo[a]pyrene hydroxylase as a biochemical barometer for petroleum in the marine environment [Abstract]. Can. Fed. Biol. Soc. Proc. 19: 101.

E1 Payne, J. F., and A. K. Bal. 1976. Cytological detection of poly (ADP-ribose) polymerase. Exp. Cell Res. 99: 428-432.

F3 Payne, R. H. 1976. Further studies on the biochemical population genetics of the capelin, Mallotus villosus: demonstration that the capelin populations of West Greenland and eastern North America are genetically distinct. ICES C.M.1976/H:24. 7 p.

F3 Payne, R. H., and T. F. Cross. 1976. A new enzyme polymorphism of potential value in investigating the population genetics of the two races of Atlantic salmon in Europe: the S-form of NADP-isocitrate dehydrogenase in liver. ICES C.M.1976/M:9. 5 p.

F3 Payne, R. H., W. H. Lear, and J. M. Jensen. 1976. The stock composition of Atlantic salmon off West Greenland in 1975. ICES C.M.1976/M:8. 5 p.

E3 Penrose, W. R., and L. L. Dawe. 1976. Results of preliminary studies on the chemistry of commercial oil-spill dispersants. Fish. Res. Board Can. MS Rep. 1352: 13 p.

E1 Penrose, W. R., and W. R. Squires. 1976. Two devices for removing supersaturating gases in aquarium systems. Trans. Am. Fish. Soc. 105(1): 116-118.

F3 Pepper, V. A. 1976. Lacustrine nursery areas for Atlantic salmon in insular Newfoundland. Fish. Mar. Serv. Res. Dev. Tech. Rep. 671: 61 p.

G2 Pinhorn, A. T. 1976. Groundfish (haddock, white hake, pollock, wolffish, porbeagle, silver hake, Atlantic argentine, monkfish), p. 5-27; pelagic fish (barracudina, Atlantic saury), p. 33-34 and catadromous fish (American eel, American smelt), p. 37-38. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

G3 Pinhorn, A. T. 1976. Catch and effort relationships of the groundfish resource in ICNAF Subareas 2 and 3. ICNAF Sel. Pap. 1: 107-116 [also ICNAF Res. Doc. 75/55, Ser. No. 3535].

G2 Pinhorn, A. T. [ed.]. 1976. Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194: 64 p. [also 1978, Ressources marines vivantes de Terre-Neuve et du Labrador: situation actuelle et possibilités d'exploitation. 66 p.].

G2 Pinhorn, A. T., and R. Wells. 1976. Groundfish (cod), p. 5-7. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

G2 Pitt, T. K. 1976. Groundfish (flatfish, American plaice, yellowtail, Greenland halibut, witch, Atlantic halibut, winter flounder), p. 5-27. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

G1 Pitt, T. K. 1976. Food of yellowtail flounder on the Grand Bank and a comparison with American plaice. ICNAF Res. Bull. 12: 23-28.

G3 Pitt, T. K. 1976. Status of fisheries and research carried out in Subarea 2 in 1975. ICNAF Annu. Rep. 26: 129-130 [also ICNAF Summ. Doc. 76/40, Ser. No. 3955].

G3 Pitt, T. K. 1976. Recent events in the yellowtail fishery in ICNAF Divisions 3L, 3N and 3O. ICNAF Res. Doc. 76/67, Ser. No. 3885. 12 p.

G3 Pitt, T. K. 1976. Contribution to the Manual on ICNAF Groundfish Surveys. ICNAF Res. Doc. 76/119, Ser. No. 3946. 14 p.

G3 Pitt, T. K. 1976. Biology and fishery of American plaice (Hippoglossoides platessoides) with special reference to the Grand Bank. Ph.D. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 160 p.

F3 Reddin, D., and D. E. Waldron. 1976. 1975 Newfoundland and Labrador Atlantic salmon commercial catch data. Fish. Mar. Serv. Res. Dev. Tech. Rep. 684: 183 p.

E2 Sandeman, E. J. 1976. Crustaceans (lobster, shrimp, krill), p. 38-40, and plants, p. 52. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

O1 *Templeman, W. 1976. Transatlantic migrations of spiny dogfish (Squalus acanthias). J. Fish. Res. Board Can. 33: 2605-2609.

O1 *Templeman, W. 1976. Biological and oceanographic background of Flemish Cap as an area for research on the reasons for year-class success and failure in cod and redfish. ICNAF Res. Bull. 12: 91-118.

O1 Templeman, W., V. M. Hodder, and A. M. Fleming. 1976. Infection of lumpfish (Cyclopterus lumpus) with larvae and of Atlantic cod (Gadus morhua) with adults of the copepod, Lernaeocera branchialis, in and adjacent to the Newfoundland area, and inferences therefrom on inshore-offshore migrations of cod. J. Fish. Res. Board Can. 33: 711-731.

G2 Wells, R. 1976. Groundfish (spiny dogfish, black dogfish, lumpfish, Arctic cod), p. 5-27. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

P1 Winters, G. H. 1976. Recruitment mechanisms of southern Gulf of St. Lawrence Atlantic herring (Clupea harengus harengus). J. Fish. Res. Board Can. 33: 1751-1763.

P2 Winters, G. H. 1976. Pelagic fish (Atlantic herring, bluefin tuna, sand lance), p. 27-33. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

P3 Winters, G. H. 1976. Estimation of mortality rates and surplus production of Northwest Atlantic harp seals. ICNAF Res. Doc. 76/127, Ser. No. 4014. 23 p.

P2 Winters, G. H., and J. S. Campbell. 1976. Pelagic fish (capelin), p. 32-33. In A. T. Pinhorn [ed.] Living marine resources of Newfoundland-Labrador: status and potential. Bull. Fish. Res. Board Can. 194.

## PUBLICATIONS - 1977


O4 Anon. 1977. Environment Canada, Fisheries and Marine Service Annual Report - 1976. Research and Resource Services, St. John's, Newfoundland. 29 p.

G3 Anon. 1977. Preliminary Report of Ageing Workshop on Cod held at St. John's, Canada, 31 January-5 February 1977 (Convenor: R. Wells). ICNAF Summ. Doc. 77/12, Ser. No. 5048. 54 p.

F1 Beverley-Burton, M., O. L. Nyman, and J.H.C. Pippy. 1977. The morphology and some observations on the population genetics of Anisakis simplex larvae (Nematoda: Ascaridata) from fishes of the North Atlantic. J. Fish. Res. Board Can. 34: 105-112.

F1 Beverley-Burton, M., and J.H.C. Pippy. 1977. Morphometric variations among larval Anisakis simplex (Nematoda: Ascaridoidea) from fishes of the North Atlantic and their use as biological indicators of host stocks. Environ. Biol. Fishes 2: 309-314.

G3 Bishop, C. A. 1977. Changes in the growth rate of Flemish Cap cod in ICNAF Div. 3M. ICNAF Res. Doc. 77/15, Ser. No. 5035. 2 p.

G3 Bishop, C. A. 1977. Cod stock evaluation - Div. 3NO. ICNAF Res. Doc. 77/17, Ser. No. 5037. 4 p. + Addendum.

G3 Bishop, C. A. 1977. Status of the 3Ps cod stock. CAFSAC Res. Doc. 77/16. 23 p. + Addenda 1, 2, 3, 4.

G3 Bowering, W. R. 1977. The status of the witch flounder fishery in ICNAF Subdivision 3Ps. ICNAF Sel. Pap. 2: 11-14 (also ICNAF Res. Doc. 76/39, Ser. No. 3823).

G3 Bowering, W. R. 1977. Trends in the Greenland halibut fishery in Subarea 2 and Divisions 3K and 3L. ICNAF Res. Doc. 77/11, Ser. No. 5031. 14 p.

G3 Bowering, W. R. 1977. An updated witch assessment for ICNAF Divisions 3N and 3O. ICNAF Res. Doc. 77/12, Ser. No. 5032. 8 p.

G3 Bowering, W. R. 1977. An analysis of the witch flounder stock of ICNAF Subdivision 3Ps. CAFSAC Res. Doc. 77/17. 10 p.

G3 Bowering, W. R., and T. K. Pitt. 1977. Length conversion factors for four species of commercial flatfish. ICNAF Res. Doc. 77/46, Ser. No. 5098. 4 p.

P3 Carscadden, J. 1977. Observations on larval capelin (Mallotus villosus) in ICNAF Division 3L. ICNAF Res. Doc. 77/16, Ser. No. 5036. 10 p.

F1 Christensen, O., and W. H. Lear. 1977. Bycatches in salmon driftnets at West Greenland in 1972. Medd. Groni. 205(5): 38 p.

F1 Cross, T. F., and R. H. Payne. 1977. NADP-isocitrate dehydrogenase polymorphism in the Atlantic salmon Salmo salar. J. Fish. Biol. 11: 493-496.

P1 Ennis, G. P. 1977. Determination of shell condition in lobsters (Homarus americanus) by means of external macroscopic examination. Proc. Natl. Shellfish. Assoc. 67: 67-70.

O3 Fleming, A. M., and J. S. Scott. 1977. Canadian research report, 1976. ICNAF Summ. Doc. 77/25, Ser. No. 5091. 13 p.

E2 Khan, M.A.Q., F. Korte, and J. F. Payne. 1977. Metabolism of pesticides by aquatic animals, p. 191-220. In M.A.Q. Khan (ed.) Pesticides in aquatic environments. Plenum Press, N.Y.

E1 Kiceniuk, J. W., and D. R. Jones. 1977. The oxygen transport system in trout (Salmo gairdneri) during sustained exercise. J. Exp. Biol. 69: 247-260.

E3 Kiceniuk, J. W., and J. F. Payne. 1977. An evaluation of death by hypoxia in a marine fish as an indicator of oil dispersant toxicity, p. 119-122. In W. R. Parker, E. Peasah, P. G. Wells, and G. F. Westlake (ed.) Proceedings of the 3rd Aquatic Toxicity Workshop, held in Halifax, Nova Scotia, November 2-3, 1976. EPS-5-AR-77-1.

F3 Lear, W. H., and F. A. Day. 1977. An analysis of biological and environmental data collected at North Harbour River, Newfoundland, during 1959-75. Fish. Mar. Serv. Res. Dev. Tech. Rep. 697: 61 p.

G3 Lopez-Veiga, E. C., R. Wells, and V. M. Hodder (ed.). 1977. Report of Ageing Workshop on Cod held at Vigo, Spain, October 1975. ICNAF Sel. Pap. 2: 155-204.

G3 McKone, W. D., and D. G. Parsons. 1977. An update of the assessment of redfish from Subarea 2 + Div. 3K, Div. 3M, Div. 3LN, and Div. 3O. ICNAF Res. Doc. 77/18, Ser. No. 5038. 22 p.

P4 Miller, R. J. 1977. Resource underutilization in a spider crab industry. Fisheries 2(3): 9-12.

E1 Misra, R. K. 1977. A multivariate method of analysing attribute data for hybridization. Biom. J. 19: 427-431.

EG3 Misra, R. K., and R. Wells. 1977. Analysis of anomalies between readers and regressions of average length on age from the Ageing Workshop on Cod held at Vigo, Spain in October 1975. ICNAF Res. Doc. 77/13, Ser. No. 5033. 6 p.

P3 Moores, J. A., and G. H. Winters. 1977. Production and yield of western Newfoundland herring stocks. CAFSAC Res. Doc. 77/3. 18 p.

P3 Moores, J. A., and G. H. Winters. 1977. Production and yield of the Placentia-St. Mary's herring stock. CAFSAC Res. Doc. 77/30. 15 p.

FE3 Moores, R. B., E.M.P. Chadwick, and R. J. Tucker. 1977. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1976. Fisheries and Marine Service Data Record No. 24. 181 p.

F3 Morry, C. J., and L. J. Cole. 1977. Limnology and fish populations of Red Indian Lake, a multi-use reservoir. Fish. Mar. Serv. Res. Dev. Tech. Rep. 691: 109 p.

G4 Parsons, L. S., and D. G. Parsons. 1977. Redfish in the Gulf of St. Lawrence: strict conservation needed. Fishermen's Information Bulletin 77-1E. 4 p.

E4 Payne, J. F. 1977. Oil spills: effects of petroleum on marine organisms. Science 196: 10.

E1 Payne, J. F. 1977. Mixed function oxidases in marine organisms in relation to petroleum hydrocarbon metabolism and detection. Mar. Pollut. Bull. 8: 112-116.

F3 Payne, R. H., and T. F. Cross. 1977. Liver aspartate aminotransferase polymorphism: a new tool for estimating proportions of European and North American salmon at West Greenland. ICES C.M.1977/M:10. 7 p.

E4 Penrose, W. R. 1977. Book Review: Gas bubble disease. D. H. Fickeisen and M. J. Schneider (ed.) Proceedings of a Workshop held at Richland, Washington, October 8-9, 1974. J. Fish. Res. Board Can. 34: 309.

E1 Penrose, W. R., H.B.S. Conacher, R. Black, J. C. Méranger, W. Miles, H. M. Cunningham, and W. R. Squires. 1977. Implications of inorganic/organic interconversion on fluxes of arsenic in marine food webs. Environ. Health Perspect. 19: 53-59.

G3 Pitt, T. K. 1977. An update of the assessment of American plaice from ICNAF Subarea 2 and Division 3K. ICNAF Res. Doc. 77/9, Ser. No. 5029. 7 p.

G3 Pitt, T. K. 1977. Assessment of yellowtail from ICNAF Divisions 3LNO. ICNAF Res. Doc. 77/19, Ser. No. 5039. 7 p.

G3 Pitt, T. K. 1977. Assessment of American plaice in ICNAF Divisions 3LNO. ICNAF Res. Doc. 77/20, Ser. No. 5040. 13 p.

G3 Pitt, T. K. 1977. A new assessment for the American plaice in ICNAF Subdivision 3Ps. CAFSAC Res. Doc. 77/13. 10 p.

G3 Pitt, T. K. 1977. Status of fishery for witch and American plaice in ICNAF Subdivision 3Pn and Divisions 4RS. CAFSAC Res. Doc. 77/14. 3 p.

F3 Porter, T. R., and D. J. Meerburg. 1977. Upwelling incubation boxes for Atlantic salmon, Salmo salar. ICES C.M.1977/M:22. 13 p.

E4 Sandeman, E. J. 1977. The Newfoundland fishery and its unused resources. Fishermen's Information Bulletin 77-4E. 4 p.

E1 Shaw, D. H., and J. R. Botta. 1977. Chemical and sensory changes in round inshore male capelin (Mallotus villosus) during prolonged storage for 24 months at -23°C. J. Fish. Res. Board Can. 34: 209-214.

E1 Shaw, D. H., R. L. Gare, and M. A. Kennedy. 1977. Chemical and sensory changes during storage of witch flounder (Glyptocephalus cynoglossus) in ice. J. Food Sci. 42: 159-162.

03 *Templeman, W. 1977. Tagging efficiency - a study of the effectiveness of tags, tagging methods and tag returns from cod tagging in the Newfoundland and adjacent areas in 1962-66. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 110 p. + tables and figures.

03 *Templeman, W., and V. M. Hodder. 1977. Comparisons of lengths of the same haddock measured at sea and on shore, and round and gutted. ICNAF Res. Doc. 77/1, Ser. No. 5001. 2 p.

E3 Vandermeulen, J. H., P. D. Keizer, and W. R. Penrose. 1977. Persistence of non-alkane components of Bunker C oil in beach sediments of Chedabucto Bay, and lack of their metabolism by molluscs, p. 469-473. In Proc. 1977 Oil Spill Conference (Prevention, Behavior, Control, Cleanup), New Orleans, La., March 8-10, 1977.

G3 Wells, R. 1977. Status of the cod stock in Division 2J, 3KL. ICNAF Res. Doc. 77/26, Ser. No. 5051. 11 p. + Addendum.

G3 Wells, R. 1977. Stratification scheme used and age composition of cod catches taken on the Flemish Cap, 2-15 Feb. 1977 by R/V A. T. CAMERON. ICNAF Res. Doc. 77/29, Ser. No. 5054. 2 p.

G3 Wells, R. 1977. Recaptures of cod tagged in Div. 2J+3KL in 1962-66. ICNAF Res. Doc. 77/45, Ser. No. 5050. 3 p.

G3 Wells, R. 1977. Status of the cod stock in the eastern Gulf of St. Lawrence. CAFSAC Res. Doc. 77/15. 9 p.

03 *Wheeler, J. P. 1977. Aspects of the biology of the brook trout, Salvelinus fontinalis (Mitchill) 1815, in the Valley River, Labrador. Fish. Mar. Serv. MS Rep. 1425: 19 p.

F3 Whelan, W. G., and R. J. Wiseman. 1977. The limnology and sport fish populations of three lakes located on the Southern Shore, Avalon Peninsula, Newfoundland. Fish. Mar. Serv. Data Rep. 26: 28 p.

P1 Winters, G. H. 1977. Estimates of tag extrusion and initial tagging mortality in Atlantic herring (Clupea harengus harengus) released with abdominally inserted magnetic tags. J. Fish. Res. Board Can. 34: 354-359.

P1 Winters, G. H. 1977. Migrations and activity levels of overwintering Atlantic herring (Clupea harengus harengus) along southwest Newfoundland. J. Fish. Res. Board Can. 34: 2396-2401.

P1 Winters, G. H. 1977. Healing of wounds and location of tags in Atlantic herring (Clupea harengus harengus) released with abdominally inserted magnetic tags. J. Fish. Res. Board Can. 34: 2402-2404.

P3 Winters, G. H., D. S. Miller, and J. A. Moores. 1977. Analysis of stock size and yield of Southern Gulf herring. CAFSAC Res. Doc. 77/2. 30 p.

P3 Winters, G. H., and J. A. Moores. 1977. Assessment of yield potential of eastern Newfoundland herring stocks. CAFSAC Res. Doc. 77/12. 22 p.

P3 Winters, G. H., and J. A. Moores. 1977. Analysis of stock size and yield of Fortune Bay herring. CAFSAC Res. Doc. 77/29. 14 p.


## PUBLICATIONS - 1978


E3 Akenhead, S. A. 1978. Report of the Canadian Planning Group of the Flemish Cap International Experiment Meeting, St. John's, Newfoundland, 12-14 September 1977. ICNAF Res. Doc. 78/80, Ser. No. 5267. 52 p.

F3 Anderson, T. C., and B. P. McDonald. 1978. A portable weir for counting migrating fishes in rivers. Fish. Mar. Serv. Tech. Rep. 733: 13 p.

F1 Beverley-Burton, M., and J.H.C. Pippy. 1978. Distribution, prevalence and mean numbers of larval Anisakis simplex (Nematoda: Ascaridoidea) in Atlantic salmon, Salmo salar L., and their use as biological indicators of host stocks. Environ. Biol. Fishes 3: 211-222.

G3 Bishop, C. A., and R. Wells. 1978. Status of the cod stock in Div. 3NO. ICNAF Res. Doc. 78/59, Ser. No. 5227. 7 p.

G3 Bishop, C. A., and R. Wells. 1978. Status of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 78/18. 52 p.

E1 Bone, Q., J. Kiceniuk, and D. R. Jones. 1978. On the role of the different fibre types in fish myotomes at intermediate swimming speeds. Fish. Bull. 76: 691-699.

E1 Botta, J. R., and D. H. Shaw. 1978. Effect of double freezing and subsequent long-term refrozen storage at -23°C on the quality of inshore male capelin (Mallotus villosus). J. Fish. Res. Board Can. 35: 452-456.

G1 Bowering, W. R. 1978. Fecundity of witch flounder (Glyptocephalus cynoglossus) from St. Pierre Bank and the Grand Bank of Newfoundland. J. Fish. Res. Board Can. 35: 1199-1206.

G1 Bowering, W. R. 1978. Age and growth of the Greenland halibut, Reinhardtius hippoglossoides (Walbaum), in ICNAF Subareas 2-4. ICNAF Res. Bull. 13: 5-10.

G3 Bowering, W. R. 1978. An analysis of the northern witch flounder stock, ICNAF Divisions 2J, 3K and 3L. ICNAF Res. Doc. 78/37, Ser. No. 5199. 7 p.

G3 Bowering, W. R. 1978. The distribution of Greenland halibut in Statistical Area "0". ICNAF Res. Doc. 78/38, Ser. No. 5200. 6 p.

G3 Bowering, W. R. 1978. The exploitation of the Greenland halibut stock complex of ICNAF Subarea 2 and Divisions 3KL. ICNAF Res. Doc. 78/39, Ser. No. 5201. 14 p.

G3 Bowering, W. R. 1978. A cohort analysis of the ICNAF Divisions 3NO witch stock. ICNAF Res. Doc. 78/40, Ser. No. 5202. 7 p.

G3 Bowering, W. R. 1978. Trends in the witch fishery on St. Pierre Bank. CAFSAC Res. Doc. 78/6. 10 p.

G3 Bowering, W. R. 1978. An analytical assessment of the witch flounder stock in the Gulf of St. Lawrence (ICNAF Divisions 4R and 4S). CAFSAC Res. Doc. 78/7. 12 p.

G3 Bowering, W. R., and T. K. Pitt. 1978. An evaluation of the status of witch flounder, Glyptocephalus cynoglossus, from ICNAF Divisions 2J, 3K and 3L. ICNAF Sel. Pap. 3: 23-28 [also ICNAF Res. Doc. 77/10, Ser. No. 5030].

P3 Carscadden, J. E. 1978. The capelin, Mallotus villosus, population spawning on the southeast shoal of the Grand Bank, 1976. ICNAF Sel. Pap. 3: 61-72 [also ICNAF Res. Doc. 77/14, Ser. No. 5034].

P3 Carscadden, J. E., D. S. Miller, and G. H. Winters. 1978. Biological aspects of the Div. 3NO capelin stock in 1977 and a capelin sequential abundance model. ICNAF Res. Doc. 78/52, Ser. No. 5217. 20 p.

F3 Case, A. B., and D. A. Rowe. 1978. Environmental guidelines for resource road construction. Information Rep. N-X-162, Fisheries and Environment Canada, Forestry Service. 41 p.

F3 Chadwick, E.M.P., and D. J. Meerburg. 1978. Sea survival of 1SW Atlantic salmon. ICES C.M.1978/M:10. 4 p.

F1 Chadwick, E.M.P., T. R. Porter, and P. Downton. 1978. Analysis of growth of Atlantic salmon (Salmo salar) in a small Newfoundland river. J. Fish. Res. Board Can. 35: 60-68.

F4 Chadwick, M., R. Porter, and D. Reddin. 1978. Atlantic salmon management program, Newfoundland and Labrador, 1978. Atl. Salmon J. 1: 9-15.

P3 Collins, P. W., and G. P. Ennis. 1978. Breakdown of inshore Newfoundland squid catches, 1975-77 with length and sex composition from commercial samples. ICNAF Res. Doc. 78/6, Ser. No. 5158. 13 p.

F1 Cross, T. F., and R. H. Payne. 1978. Geographic variation in Atlantic cod, Gadus morhua, off eastern North America: a biochemical systematics approach. J. Fish. Res. Board Can. 35: 117-123.

E1 Dave, L. L., and W. R. Penrose. 1978. "Bactericidal" property of seawater: death or debilitation? Appl. Environ. Microbiol. 35: 829-833.

F3 Dempson, J. B. 1978. Biological assessment of Arctic char (Salvelinus alpinus L.) stocks and summary of the Atlantic salmon (Salmo salar L.) fishery in northern Labrador. Fish. Mar. Serv. Tech. Rep. 817: v + 54 p.

F3 Dempson, J. B., and C. Best. 1978. Evaluation of the 1976 Arctic char fishery in northern Labrador. Fish. Mar. Serv. Tech. Rep. 760: 45 p.

P3 Ennis, G. P. 1978. A review of the fishery for squid and the general biological characteristics of the species, Illex illecebrosus, in the Newfoundland area, p. 5.1-5.8. In N. Balch, T. Amaratunga, and R. K. O'Dor [ed.] Proceedings of the Workshop on the Squid Illex illecebrosus. Dalhousie University, Halifax, Nova Scotia, May 1978; and a Bibliography on the Genus Illex. Fish. Mar. Serv. Tech. Rep. 833.

P3 Ennis, G. P. 1978. Growth curves for Newfoundland lobsters from data on molt increment and proportion molting. CAFSAC Res. Doc. 78/29. 11 p.

P3 Ennis, G. P. 1978. Yield per recruit assessments for Newfoundland lobster stocks. CAFSAC Res. Doc. 78/31. 18 p.

PE3 Ennis, G. P., and S. A. Akenhead. 1978. A model and computer program used to assess yield per recruit in Newfoundland lobster stocks. CAFSAC Res. Doc. 78/30. 13 p.

P3 Jones, B. C., and D. G. Parsons. 1978. Assessment of pink shrimp (Pandalus borealis) fishery potential in Davis Strait and northeastern Canadian waters. ICNAF Res. Doc. 78/87, Ser. No. 5303. 15 p.

E1 Kiceniuk, J. W., W. R. Penrose, and W. R. Squires. 1978. Oil spill dispersants cause bradycardia in a marine fish. Mar. Pollut. Bull. 9: 42-45.

G1 Kulka, D. W., and S. Corey. 1978. The life history of Thysanoessa inermis (Krøyer) in the Bay of Fundy. Can. J. Zool. 56: 492-506.

G4 Kulka, D. W., and F. J. Ring. 1978. Foreign observer program, Nfld. Region: foreign fishery observer operations manual. Environment Canada, Fisheries and Marine Service, Research and Resource Services. 350 p.

FE1 Lear, W. H., and R. K. Misra. 1978. Clinal variation in scale characters of Atlantic salmon (Salmo salar) based on discriminant function analysis. J. Fish. Res. Board Can. 35: 43-47.

P1 Leggett, W. C., and J. E. Carscadden. 1978. Latitudinal variation in reproductive characteristics of American shad (Alosa sapidissima): evidence for population specific life history strategies in fish. J. Fish. Res. Board Can. 35: 1469-1478.

O3 *MacLaren Marex Inc. 1978. Report on exploratory fishing assessment of pink shrimp fishery potential in northeastern Canadian waters. Report submitted to Fisheries and Environment Canada (Newfoundland Region). 26 p.

O3 *MacLaren Marex Inc. 1978. Report on CANSO CONDOR - shrimp and groundfish cruise of July 28-September 4, 1978 in northeastern Canadian waters. Report submitted to Fisheries and Environment Canada (Newfoundland Region). 198 p.

G3 McKone, W. D. 1978. Assessment of Divisions 3LN redfish. ICNAF Res. Doc. 78/46, Ser. No. 5208. 10 p.

G3 McKone, W. D. 1978. An update of Flemish Cap redfish assessment. ICNAF Res. Doc. 78/48, Ser. No. 5210. 7 p.

G3 McKone, W. D. 1978. Division 3O redfish assessment. CAFSAC Res. Doc. 78/20. 6 p.

G3 McKone, W. D. 1978. A general production model assessment of Subarea 2 + Division 3K redfish. CAFSAC Res. Doc. 78/22. 7 p.

P3 Miller, D. S., J. E. Carscadden, and B. Bennett. 1978. An acoustic estimate of capelin (Mallotus villosus) biomass, ICNAF Divisions 2J and 3K, October and November 1977. ICNAF Res. Doc. 78/43, Ser. No. 5205. 7 p.

P1 Miller, R. J. 1978. Entry of Cancer productus to baited traps. J. Cons. Int. Explor. Mer 38: 220-225.

P3 Miller, R. J. 1978. Crab (Cancer irroratus and Hyas araneus) ease of entry to baited traps. Fish. Mar. Serv. Tech. Rep. 771: 8 p.

P3 Miller, R. J., and M. McInerney. 1978. Packing density and swimming speed of schooling capelin (Mallotus villosus). ICES C.M.1978/B:26. 4 p.

E1 Misra, R. K. 1978. Discriminant analysis of biological shape profile for hybridization. Biom. J. 20: 385-388.

P3 Moores, J. A., and G. H. Winters. 1978. The Newfoundland west coast herring stocks. CAFSAC Res. Doc. 78/2. 22 p.

P3 Moores, J. A., and G. H. Winters. 1978. Growth patterns in a Newfoundland herring stock. CAFSAC Res. Doc. 78/43. 22 p.

F3 Moores, R. B. 1978. Fishway and counting fence data - 1975 and 1976. Fish. Mar. Serv. Data Rep. 59: 64 p.

FE3 Moores, R. B., R. W. Penney, and R. J. Tucker. 1978. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1953-77. Fish. Mar. Serv. Data Rep. 84: 274 p.

FE3 Moores, R. B., and R. J. Tucker. 1978. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1977. Fish. Mar. Serv. Data Rep. 60: 180 p.

E4 Muir, B. S., and E. J. Sandeman. 1978. Research for fisheries management - today's research for tomorrow's needs. Can. Fisherman Ocean Sci. 64: 13-15.

P4 Naidu, K. S. 1978. Culture of the sea scallop, Placopecten magellanicus (Gmelin) in Newfoundland [Abstract]. Proc. Nati. Shellfish. Assoc. 68: 83-84.

P1 Naidu, K. S., and J. R. Botta. 1978. Taste panel assessment and proximate composition of cultured and wild sea scallops, Placopecten magellanicus (Gmelin). Aquaculture 15: 243-247.

P4 Naidu, K. S., and F. M. Cahill. 1978. Scallop culture in Newfoundland: a progress report for 1977-1978. Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 32 p.

G3 Parsons, D. G. 1978. Effects of a by-catch of young redfish in the Port au Choix shrimp fishery - first implications. CAFSAC Res. Doc. 78/8. 18 p.

G3 Parsons, D. G., P. J. Veitch, and W. E. Legge. 1978. Some characteristics of the roundnose grenadier fisheries in ICNAF Subareas 0+1 and 2+3. ICNAF Res. Doc. 78/47, Ser. No. 5209. 9 p.

G3 Parsons, D. G., P. J. Veitch, and E. M. LeGrow. 1978. Some characteristics of winter concentrations of redfish in the Southern Gulf of St. Lawrence and Cabot Strait areas. CAFSAC Res. Doc. 78/10. 18 p.

E4 Payne, J. F. 1978. Letter: Petroleum, a pollutant in search of toxicity? Mar. Pollut. Bull. 9: 54-55.

E1 Payne, J. F., J. W. Kiceniuk, W. R. Squires, and G. L. Fletcher. 1978. Pathological changes in a marine fish after a 6-month exposure to petroleum. J. Fish. Res. Board Can. 35: 665-667.

E1 Payne, J. F., I. Martins, and A. Rahimtula. 1978. Crankcase oils: are they a major mutagenic burden in the aquatic environment? Science 200: 329-330.

E1 Payne, J. F., and N. May. 1978. Oxidative transformation of complex mixtures of pollutant aromatic hydrocarbons by fish. Chemosphere 7: 815-819.

E1 Penrose, W. R. 1978. The petroleum-inducible mixed-function oxidase of cunner (Tautogolabrus adspersus Walbaum 1792): some characteristics relevant to hydrocarbon monitoring. J. Fish. Res. Board Can. 35: 1547-1552.

E1 Penrose, W. R. 1978. Specific biological methods for petroleum baseline and pollution monitoring. Mar. Pollut. Bull. 9: 231-234.

F3 Pippy, J.H.C. 1978. Canada, p. 1-9. In Administrative Report of the Anadromous and Catadromous Fish Committee. ICES C.M.1978/M:1.

G3 Pitt, T. K. 1978. American plaice in ICNAF Divisions 3LNO, a stock assessment update. ICNAF Res. Doc. 78/35, Ser. No. 5197. 14 p.

G3 Pitt, T. K. 1978. Abundance indices for American plaice and yellowtail from stratified random surveys on the Grand Bank. ICNAF Res. Doc. 78/36, Ser. No. 5198. 8 p.

G3 Pitt, T. K. 1978. An assessment update of yellowtail from ICNAF Divisions 3LNO. ICNAF Res. Doc. 78/41, Ser. No. 5203. 6 p.

G3 Pitt, T. K. 1978. American plaice from ICNAF Subarea 2 and Division 3K, a stock assessment update. CAFSAC Res. Doc. 78/11. 6 p.

F3 Reddin, D. 1978. Report on the salmon by-catch in miscellaneous marine fishing gear, 1976, Newfoundland and Labrador. Fish. Mar. Serv. MS Rep. 1461: 23 p.

FE3 Reddin, D. G., and R. K. Misra. 1978. Multivariate analyses of Atlantic salmon (Salmo salar) caught in the Twillingate fall commercial fishery. ICES C.M.1978/M:11. 7 p.

E3 Sandeman, E. J. 1978. Shrimp (Pandalus borealis) in the Labrador area - a first assessment. CAFSAC Res. Doc. 78/1. 14 p.

E3 Sandeman, E. J. 1978. An assessment of the stock of shrimp (Pandalus borealis) in the Esquiman Channel, Gulf of St. Lawrence. CAFSAC Res. Doc. 78/26. 15 p.

03 Sandeman, E. J., and J. S. Scott. 1978. Canadian research report, 1977. ICNAF Summ. Doc. 78/20, Ser. No. 5254. 14 p.

P1 Sharp, J. C., K. W. Able, W. C. Leggett, and J. E. Carscadden. 1978. Utility of meristic and morphometric characters for identification of capelin (Mallotus villosus) stocks in Canadian Atlantic waters. J. Fish. Res. Board Can. 35: 124-130.

E1 Shaw, D. H., and H. J. Hodder. 1978. Lipopolysaccharides of the motile aeromonads; core oligosaccharide analysis as an aid to taxonomic classification. Can. J. Microbiol. 24: 864-868.

G3 Stevenson, S. C. 1978. A descriptive report on the discarding of fish by the Canadian offshore fishery in ICNAF Subareas 2 and 3. ICNAF Res. Doc. 78/67, Ser. No. 5237. 14 p.

OG1 Templeman, W., V. M. Hodder, and R. Wells. 1978. Age, growth, year-class strength, and mortality of the haddock, Melanogrammus aeglefinus, on the southern Grand Bank and their relation to the haddock fishery of this area. ICNAF Res. Bull. 13: 31-52.

OG1 Templeman, W., V. M. Hodder, and R. Wells. 1978. Sexual maturity and spawning in haddock, Melanogrammus aeglefinus, of the southern Grand Bank. ICNAF Res. Bull. 13: 53-66.

E1 Vandermeulen, J. H., and W. R. Penrose. 1978. Absence of aryl hydrocarbon hydroxylase (AHH) activity in three marine bivalves. J. Fish. Res. Board Can. 35: 643-647.

PG3 Veitch, P. J., D. G. Parsons, and A. Duthie. 1978. An exploratory survey for shrimp (Pandalus borealis) in Statistical Areas 0A and 0B. ICNAF Res. Doc. 78/88, Ser. No. 5304. 9 p.

E1 Walton, D. G., W. R. Penrose, and J. M. Green. 1978. The petroleum-inducible mixed-function oxidase of cunner (Tautogolabrus adspersus Walbaum 1792): some characteristics relevant to hydrocarbon monitoring. J. Fish. Res. Board Can. 35: 1547-1552.

G3 Wells, R. 1978. Status of the cod stock on Flemish Cap. ICNAF Res. Doc. 78/57, Ser. No. 5225. 6 p.

G3 Wells, R. 1978. Status of the cod stock in Divisions 2J, 3KL. ICNAF Res. Doc. 78/66, Ser. No. 5236. 10 p.

G3 Wells, R., and G. H. Kean. 1978. Length-weight relationships of cod in Subdivision 3Ps and Area 3Pn4Rs in winter, 1978. CAFSAC Res. Doc. 78/9. 7 p.

P1 Winters, G. H. 1978. Production, mortality, and sustainable yield of Northwest Atlantic harp seals (Pagophilus groenlandicus). J. Fish. Res. Board Can. 35: 1249-1261.

P3 Winters, G. H. 1978. Recent trends in stock size, recruitment and biological characteristics of Southern Gulf herring. CAFSAC Res. Doc. 78/3. 17 p.

P3 Winters, G. H. 1978. Estimation of natural and total mortality rates of Northwest Atlantic mackerel. CAFSAC Res. Doc. 78/35. 10 p.

P1 Winters, G. H., and J. S. Beckett. 1978. Migrations, biomass and stock interrelationships of southwest Newfoundland-southern Gulf herring from mark-recapture experiments. ICNAF Res. Bull. 13: 67-80.

P3 Winters, G. H., and B. Bergflódt. 1978. Mortality and productivity of the Newfoundland hooded seal stock. ICNAF Res. Doc. 78/91, Ser. No. 5307. 5 p.

P1 Winters, G. H., and J. E. Carscadden. 1978. Review of capelin ecology and estimation of surplus yield from predator dynamics. ICNAF Res. Bull. 13: 21-30.

P3 Winters, G. H., and J. A. Moores. 1978. Prognoses of yield and abundance of southeast Newfoundland herring for 1979. CAFSAC Res. Doc. 78/34. 12 p.

PUBLICATIONS - 1979

E3 Akenhead, S. A. 1979. Plankton and hydrography of Flemish Cap, some recent observations, p. 59. In Proc. Symp. on Research in the Labrador Coastal and Offshore Region, St. John's, Nfld., May 8-10, 1979.

G3 Atkinson, B. 1979. Small redfish by-catch in the shrimp fishery at Port au Choix, Newfoundland. CAFSAC Res. Doc. 79/25. 21 p.

G3 Atkinson, D. B. 1979. Roundnose grenadier stocks in ICNAF Subareas 0+1 and 2+3. ICNAF Res. Doc. 79/57, Ser. No. 5397. 9 p.

P3 Atkinson, D. B., and J. E. Carscadden. 1979. Biological characteristics of inshore capelin, Mallotus villosus (Müller), June-July 1977. Fish. Mar. Serv. Tech. Rep. 881: iv + 18 p.

G3 Atkinson, D. B., W. D. McKone, and W. E. Legge. 1979. Assessment of 3P redfish. CAFSAC Res. Doc. 79/42. 29 p.

E1 Banoub, J., and D. R. Bundle. 1979. Stannic tetrachloride catalysed glycosylation of 8-ethoxycarbonyloctanol by cellobiose, lactose, and maltose octaacetates; synthesis of α- and β-glycosidic linkages. Can. J. Chem. 57: 2085-2090.

E1 Banoub, J., and D. R. Bundle. 1979. 1,2-Orthoacetate intermediates in silver trifluoromethanesulphonate promoted Koenigs-Knorr synthesis of disaccharide glycosides. Can. J. Chem. 57: 2091-2097.

G3 Batten, W. N., and R. Wells. 1979. On the consistency of ageing cod otoliths at the St. John's Laboratory. ICNAF Res. Doc. 79/68, Ser. No. 5410. 8 p.

G3 Bishop, C. A. 1979. An assessment of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 79/22. 16 p.

G3 Bishop, C. A., and R. Wells. 1979. Status of the cod stock in Divisions 3NO. ICNAF Res. Doc. 79/67, Ser. No. 5409. 23 p.

P3 Bowen, W. D. 1979. Changes in harp seal reproductive parameters: another look. NAFO SCR Doc. 79/1, Ser. No. N012. 12 p.

P3 Bowen, W. D. 1979. A mark-recapture experiment to determine harp seal pup production on the Front, 1979. NAFO SCR Doc. 79/4, Ser. No. N015. 12 p.

P3 Bowen, W. D., and D. E. Sergeant. 1979. Research on the population biology of harp seals in 1979. NAFO SCR Doc. 79/3, Ser. No. N014. 16 p.

P3 Bowen, W. D., and G. H. Winters. 1979. On population size and sustainable yield of Northwest Atlantic harp seals. NAFO SCR Doc. 79/12, Ser. No. N023. 9 p.

G1 Bowering, W. R. 1979. Diurnal variation in availability of witch flounder, Glyptocephalus cynoglossus, and its effect upon estimates of biomass. ICNAF Res. Bull. 14: 73-76.

G3 Bowering, W. R. 1979. Distribution and abundance of witch flounder (Glyptocephalus cynoglossus) in Subarea 2 and Divisions 3KLNO in relation to the fishery. ICNAF Res. Doc. 79/44, Ser. No. 5383. 8 p.

G3 Bowering, W. R. 1979. Recruitment prospects for Greenland halibut in Statistical Area 0. ICNAF Res. Doc. 79/60, Ser. No. 5401. 6 p.

G3 Bowering, W. R. 1979. Trends in the witch flounder fishery in Divisions 2J, 3K and 3L. ICNAF Res. Doc. 79/64, Ser. No. 5406. 10 p.

G3 Bowering, W. R. 1979. General production and cohort analysis of witch in Divisions 3NO. ICNAF Res. Doc. 79/65, Ser. No. 5407. 10 p.

G3 Bowering, W. R. 1979. The Greenland halibut fishery on the continental shelf of ICNAF Subarea 2 and Div. 3KL. ICNAF Res. Doc. 79/71, Ser. No. 5413. 14 p.

G3 Bowering, W. R. 1979. The feasibility of using stratified random survey design for measuring groundfish abundance in inshore bays. CAFSAC Res. Doc. 79/7. 11 p.

G3 Bowering, W. R. 1979. Current status of the witch fishery in the Gulf of St. Lawrence (ICNAF Divisions 4RS). CAFSAC Res. Doc. 79/8. 17 p.

G3 Bowering, W. R. 1979. A developing interest for Greenland halibut in the Gulf of St. Lawrence. CAFSAC Res. Doc. 79/9. 12 p.

G3 Bowering, W. R. 1979. The population structure of witch flounder in ICNAF Subdivision 3Ps. CAFSAC Res. Doc. 79/13. 17 p.

F3 Bruce, W. J. 1979. Age and growth of brook trout (Salvelinus fontinalis) in the Churchill River watershed, Labrador. Fish. Mar. Serv. Tech. Rep. 907: iv + 18 p.

F3 Bruce, W. J., and R. F. Parsons. 1979. Biology of the fishes of Ossokmanuan Reservoir, Labrador, 1976. Fish. Mar. Serv. Tech. Rep. 836: iv + 33 p.

F3 Bruce, W. J., and K. D. Spencer. 1979. Mercury levels in Labrador fish, 1977-78. Can. Ind. Rep. Fish. Aquat. Sci. 111: iv + 12 p.

F3 Bruce, W. J., K. D. Spencer, and E. Arsenault. 1979. Mercury content data for Labrador fishes, 1977-78. Fish. Mar. Serv. Data Rep. 142: iv + 263 p.

P3 Carscadden, J. E. 1979. Capelin (Mallotus villosus) in the Gulf of St. Lawrence. CAFSAC Res. Doc. 79/24. 13 p.

P3 Carscadden, J. E., and D. S. Miller. 1979. Biological aspects of capelin and a sequential capelin abundance model for the Divisions 3LNO stock. ICNAF Res. Doc. 79/33, Ser. No. 5359. 20 p.

PE3 Carscadden, J. E., and R. K. Misra. 1979. Multivariate analysis of meristic characters of capelin (Mallotus villosus) in the Northwest Atlantic. ICNAF Res. Doc. 79/29, Ser. No. 5355. 11 p.

F4 Chadwick, M. 1979. Book Review: Ecology of freshwater fish production. Environ. Biol. Fishes 4: 402-403.

F3 Dempson, J. B., L. LeDrew, and T. Nicholls. 1979. Review of biological information on Arctic char (Salvelinus alpinus) in Labrador and present status of the commercial fishery, p. 60-74. In Proc. Symp. on Research in the Labrador Coastal and Offshore Region, St. John's, Nfld., May 8-10, 1979.

FPG3 Dempson, J. B., D. G. Parsons, and R. Wells. 1979. Fisheries resources in the Labrador area, p. 43-58. In Proc. Symp. on Research in the Labrador Coastal and Offshore Region, St. John's, Nfld., May 8-10, 1979.

P1 Ennis, G. P. 1979. Estimates of abundance and recruitment to the standing stock for a Newfoundland population of the lobster, Homarus americanus, with a method of estimating its natural mortality. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 175: 225-228.

P3 Ennis, G. P. 1979. Size-maturity relationships and related observations in Newfoundland populations of the lobster (Homarus americanus). ICES C.M.1979/K:12. 22 p.

P3 Ennis, G. P., and P. W. Collins. 1979. Food and feeding of the short-finned squid, Illex illecebrosus, during its seasonal occurrence in the Newfoundland area. ICNAF Sel. Pap. 5: 25-30 [also ICNAF Res. Doc. 78/7, Ser. No. 5159].

E3 Fairbairn, D. J. 1979. Evidence for the underestimation of the proportion of North American salmon in the West Greenland feeding aggregate. CAFSAC Res. Doc. 79/26. 16 p.

E3 Fairbairn, D. J. 1979. Evidence for the underestimation of the proportion of North American salmon in the West Greenland feeding aggregate. ICES C.M.1979/M:19. 17 p.

F2 Farwell, M. K., and T. R. Porter. 1979. Atlantic salmon enhancement techniques in Newfoundland, p. 560-563. In T.V.R. Pillay and W. A. Dill [ed.] Advances in aquaculture. FAO Tech. Conf. on Aquaculture, 26 May-2 June, 1976, Kyoto, Japan. Fishing News Books Ltd., Farnham, Eng.

P3 Fitzpatrick, C., and R. J. Miller. 1979. Review of spawning times and locations for some commercial finfish on the Newfoundland and Labrador coasts. Fish. Mar. Serv. Tech. Rep. 905: v + 14 p.

E1 Fletcher, G. L., J. W. Kiceniuk, M. J. King, and J. F. Payne. 1979. Reduction of blood plasma copper concentrations in a marine fish following a six month exposure to crude oil. Bull. Environ. Contam. Toxicol. 22: 548-551.

G3 Gavaris, C. 1979. Flemish Cap redfish assessment. ICNAF Res. Doc. 79/62, Ser. No. 5403. 10 p.

G3 Gavaris, C. A. 1979. An assessment of Subarea 2+Division 3K redfish. CAFSAC Res. Doc. 79/33. 19 p.

G3 Gavaris, S. 1979. Update of the cod stock assessment for Divisions 3NO. ICNAF Res. Doc. 79/45, Ser. No. 5384. 5 p.

G3 Gavaris, S. 1979. Update of the Flemish Cap cod stock assessment. ICNAF Res. Doc. 79/46, Ser. No. 5385. 6 p.

G3 Gavaris, S. 1979. Assessment of the cod stock in Divisions 2GH. ICNAF Res. Doc. 79/47, Ser. No. 5386. 5 p.

G3 Gavaris, S. 1979. Assessment of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 79/18. 11 p.

P4 Hay, K. A. 1979. Guide to identification of whales in Newfoundland-Labrador waters. Research and Resource Services, Department of Fisheries and Oceans, St. John's, Newfoundland. 21 p.

P1 Hurley, G. V., and P. Beck. 1979. The observation of growth rings in statoliths from the ommastrephid squid, Illex illecebrosus. Bull. Am. Malacol. Union Inc. 1979: 23-29.

P3 Hurley, G. V., and P. Beck. 1979. Assessment of the short-finned squid (Illex illecebrosus) in ICNAF Subarea 3 for 1978. ICNAF Res. Doc. 79/25, Ser. No. 5351. 19 p.

P3 Hurley, G. V., P. Beck, and J. Drew. 1979. Breakdown of squid catches in ICNAF Subarea 3, 1978, with length and sex composition from offshore and Newfoundland inshore samples. ICNAF Res. Doc. 79/27, Ser. No. 5353. 13 p.

P3 Hurley, G. V., P. Beck, J. Drew, and R. L. Radtke. 1979. A preliminary report on validating age readings from statoliths of the short-finned squid (Illex illecebrosus). ICNAF Res. Doc. 79/26, Ser. No. 5352. 6 p.

P3 Hurley, G. V., and R. K. Mohn. 1979. Considerations on the management of the international squid (Illex) fishery in ICNAF Subarea 4. ICNAF Res. Doc. 79/24, Ser. No. 5350. 11 p.

F3 Jamieson, A. 1979. A water quality atlas for streams and lakes of Labrador. Fish. Mar. Serv. Data Rep. 148: iv + 53 p.

G3 Kulka, D. W. 1979. Catch per unit effort and its pattern of variability in the Canadian Fishing Zone, January and February 1979. ICNAF Res. Doc. 79/111, Ser. No. 5476. 20 p.

G3 Lear, W. H. 1979. Distribution, size and sexual maturity of Arctic cod (Boreogadus saida) in the Northwest Atlantic during 1959-1978. CAFSAC Res. Doc. 79/17. 40 p.

G3 Lear, W. H., R. Wells, and W. Templeman. 1979. The discreteness of the Flemish Cap stock. ICNAF Res. Doc. 79/76, Ser. No. 5418. 9 p.

G3 Lilly, G. R. 1979. Observations on the food of cod (Gadus morhua L.) on the Flemish Cap in winter. ICNAF Res. Doc. 79/70, Ser. No. 5412. 8 p.

O4 *MacLaren Marex Inc. 1979. Report on literature review of pink shrimp fishery potential in northeastern Canadian waters. Report submitted to Fisheries and Environment Canada (Newfoundland Region). 53 p.

G3 McKone, W. D. 1979. Assessment of redfish in Divisions 3LN. ICNAF Res. Doc. 79/72, Ser. No. 5414. 12 p.

G3 McKone, W. D. 1979. Division 3M redfish mesh assessment. ICNAF Res. Doc. 79/121, Ser. No. 5489. 7 p.

G3 McKone, W. D., and C. A. Gavaris. 1979. Redfish assessment Division 3O. CAFSAC Res. Doc. 79/34. 14 p.

P3 Miller, D. S. 1979. An acoustic estimate of juvenile Arctic cod (Boreogadus saida) abundance in ICNAF Divisions 2J and 3K 1978. CAFSAC Res. Doc. 79/12. 11 p.

P3 Miller, D. S., and J. E. Carscadden. 1979. Biological characteristics and biomass estimates of capelin in ICNAF Div. 2J+3K using a sequential capelin abundance model. ICNAF Res. Doc. 79/32, Ser. No. 5358. 15 p.

P3 Miller, D. S., and J. E. Carscadden. 1979. An acoustic estimate of capelin biomass in ICNAF Divisions 2J and 3K, October 1978. ICNAF Res. Doc. 79/34, Ser. No. 5360. 9 p.

P4 Miller, R. J. 1979. Social rationales for management of a crab fishery. Fisheries 4(6): 28-32.

P1 Miller, R. J. 1979. Saturation of crab traps: reduced entry and escapement. J. Cons. int. Explor. Mer 38: 346-350.

P3 Moores, J. A. 1979. Analysis of the status of the Newfoundland west coast herring stock. CAFSAC Res. Doc. 79/3. 17 p.

P3 Moores, J. A., and G. H. Winters. 1979. Analysis of the current status of Fortune Bay herring stock. CAFSAC Res. Doc. 79/35. 18 p.

FE3 Moores, R. B., and R. J. Tucker. 1979. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1978. Fish. Mar. Serv. Data Rep. 147: xv + 105 p.

F1 Musial, C. J., J. F. Uthe, R. J. Wiseman, and R. A. Matheson. 1979. Occurrence of PCB residues in burbot (Lota lota) and lake trout (Salvelinus namaycush) from the Churchill Falls Power Development Area. Bull. Environ. Contam. Toxicol. 23: 256-261.

P4 Naidu, K. S., F. M. Cahill, and P. W. Collins. 1979. Scallop culture in Newfoundland: a progress report for 1978-1979. Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 55 p.

P2 Naidu, K. S., and R. Scaplen. 1979. Settlement and survival of giant scallop, Placopecten magellanicus, larvae on enclosed polyethylene film collectors, p. 379-381. In T.V.R. Pillay and W. A. Dill [ed.] Advances in aquaculture. FAO Tech. Conf. on Aquaculture, 26 May-2 June, 1976, Kyoto, Japan. Fishing News Books Ltd., Farnham, Eng.

G3 Ni, I-H. 1979. Comparative fish population dynamics - a feasibility study. ICES C.M.1979/H:34. 49 p.

P3 Parsons, D. G. 1979. Canadian research efforts for shrimp (Pandalus borealis) in Division 0A and Subarea 1 in 1979. NAFO SCR Doc. 79/7, Ser. No. N018. 16 p.

P3 Parsons, D. G., G. E. Tucker, and P. J. Veitch. 1979. An assessment of the Labrador shrimp fishery. CAFSAC Res. Doc. 79/1. 46 p.

E3 Payne, J. F. 1979. Oil and fisheries: an attempt to define the more probable hazards, p. 190-191. In Proc. Symp. on Research in the Labrador Coastal and Offshore Region, St. John's, Nfld., May 8-10, 1979.

E3 Payne, J. F., R. Maloney, and A. Rahimtula. 1979. Are petroleum hydrocarbons an important source of mutagens in the marine environment, p. 533-536. In Proc. 1979 Oil Spill Conf., Los Angeles, Calif., March 19-22, 1979. Am. Pet. Inst. Publ. 4308.

E2 Payne, J. F., and N. May. 1979. Further studies on the effect of petroleum hydrocarbons on mixed function oxidases in marine organisms, p. 339-347. In M.A.Q. Khan, J. J. Lech, and J. J. Menn [ed.] Pesticide and xenobiotic metabolism in aquatic organisms. ACS Symposium Series 99.

E1 Penrose, W. R., R. G. Murphy, L. L. Dawe, M. D. White, W. P. Gulliver, and D. G. Walton. 1979. Transformation of 2,5-diphenyloxazole and derivatives by mixed function oxidases of a marine fish. Chemosphere 8: 509-520.

G3 Pinhorn, A. T. 1979. The northern cod resource, p. 53-72. In Proc. Northern Cod Seminar, Corner Brook, Nfld., Aug. 28-30, 1979.

F3 Pippy, J.H.C. 1979. Canada, p. 1-8. In Administrative Report of the Anadromous and Catadromous Fish Committee. ICES C.M.1979/M:1.

G3 Pitt, T. K. 1979. American plaice in ICNAF Divisions 3L, 3N, and 3O: a stock assessment update. ICNAF Res. Doc. 79/108, Ser. No. 5473. 22 p.

G3 Pitt, T. K. 1979. Assessment update for yellowtail flounder in Divisions 3LNO. ICNAF Res. Doc. 79/128, Ser. No. 5524. 7 p.

G3 Pitt, T. K. 1979. American plaice in ICNAF Subdivision 3Ps - stock assessment update. CAFSAC Res. Doc. 79/10. 16 p.

G3 Pitt, T. K. 1979. An assessment update of American plaice - ICNAF Subarea 2 and Division 3K. CAFSAC Res. Doc. 79/11. 9 p.

F3 Porter, T. R. 1979. A review of factors affecting the rate of return of tagged Atlantic salmon and effects of tagging. ICES C.M.1979/M:15. 17 p.

E1 Radziejewska-Lebrecht, J., D. H. Shaw, D. Borowiak, I. Fromme, and H. Mayer. 1979. Gas-chromatographic-mass spectrometric identification of a range of methyl ethers from L-glycero-D-mannoheptose and D-glycero-D-mannoheptose. J. Chromatogr. 179: 113-122.

F3 Reddin, D. G. 1979. Evidence of an underestimation of the proportion of North American origin Atlantic salmon caught in the commercial fisheries at West Greenland. ICES C.M.1979/M:17. 7 p.

F3 Reddin, D. G. 1979. Refinement of the estimation of catch of North American and European origin salmon at West Greenland. ICES C.M.1979/M:18. 4 p. [also CAFSAC Res. Doc. 79/61].

F3 Reddin, D. G., and R. F. Burfitt. 1979. The stock composition of Atlantic salmon off West Greenland and in the Labrador Sea. ICES C.M.1979/M:16. 17 p.

F3 Reddin, D. G., and R. F. Burfitt. 1979. Length, weight, sex and age characteristics of Atlantic salmon (Salmo salar) of North American and European origin caught at West Greenland in 1978. ICES C.M.1979/M:20. 18 p.

F3 Reddin, D. G., R. F. Burfitt, and W. H. Lear. 1979. The stock composition of Atlantic salmon off West Greenland and in the Labrador Sea in 1978 and a comparison to other years. CAFSAC Res. Doc. 79/3. 27 p.

F3 Ritter, J. A., T. L. Marshall, and D. G. Reddin. 1979. A review of non-catch fishing mortality as it relates to Atlantic salmon (Salmo salar L.) fisheries. ICES C.M.1979/M:25. 9 p.

O3 Sandeman, E. J., and J. S. Scott. 1979. Canadian research report, 1978. ICNAF Summ. Doc. 79/19, Ser. No. 5428. 14 p. + Addendum.

O3 *ShawMont Newfoundland Ltd. 1979. Feasibility and site selection study for a multi-purpose fish rearing facility on the island of Newfoundland. Report submitted to Fisheries and Environment Canada (Newfoundland Region). Rep. No. SMR-4-79. 2 vol. (Vol. 1 - Site selection; Vol. 2 - Conceptual layout at selected sites).

G3 Smith, S. J. 1979. On estimating the variance of the estimate of catch per unit effort. ICNAF Res. Doc. 79/110, Ser. No. 5475. 11 p.

G3 Stevenson, S. C. 1979. Results of redfish mesh selection experiment on Flemish Cap, August 1978. ICNAF Res. Doc. 79/43, Ser. No. 5382. 7 p.

P1 Taylor, D. M., G. F. Bennett, and D. J. Lewis. 1979. Observations on the host-seeking activity of some Culicidae in the Tantramar Marshes, New Brunswick. J. Med. Entomol. 15: 134-137.

O1 *Templeman, W. 1979. Migration and intermingling of stocks of Atlantic cod, Gadus morhua, of the Newfoundland and adjacent areas from tagging in 1962-66. ICNAF Res. Bull. 14: 5-50.

O3 *Templeman, W. 1979. Cod livers, cod liver oil and Vitamin A in cod liver oil from St. John's inshore, Grand Bank north of 46°N and Grand Bank south of 46°N. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 162 p. + tables and figures.

OG1 Templeman, W., and C. A. Bishop. 1979. Sexual maturity and spawning in haddock, Melanogrammus aeglefinus, of St. Pierre Bank. ICNAF Res. Bull. 14: 77-84.

OG1 Templeman, W., and C. A. Bishop. 1979. Age, growth, year-class strength, and mortality of haddock, Melanogrammus aeglefinus, on St. Pierre Bank in 1948-75 and their relation to the haddock fishery of this area. ICNAF Res. Bull. 14: 85-99.

G3 Wells, R. 1979. Draft Report of Meeting of Flemish Cap Working Group, 2-3 April 1979, St. John's, Nfld. ICNAF Summ. Doc. 79/28, Ser. No. 5484. 9 p.

G3 Wells, R. 1979. Observations on the distribution, abundance, growth, mortality and sex and maturity of cod from the Flemish Cap. ICNAF Res. Doc. 79/63, Ser. No. 5404. 20 p.

G3 Wells, R. 1979. Status of the cod stock in Division 3M. ICNAF Res. Doc. 79/79, Ser. No. 5425. 12 p.

G3 Wells, R. 1979. Effects of changes in codend mesh size on cod catches in the Flemish Cap area. ICNAF Res. Doc. 79/122, Ser. No. 5490. 5 p.

G3 Wells, R. 1979. Status of the cod stock in Div. 4RS 3Pn. CAFSAC Res. Doc. 79/23. 11 p.

G3 Wells, R., and A. I. Postolsky. 1979. Interpretation of the ages of cod from an exchange of cod otoliths taken on the Flemish Cap. ICNAF Res. Doc. 79/81, Ser. No. 5436. 8 p.

O3 *Whitehead, H., N. Davies, K. Ingham, and M. Moore. 1979. The humpback whales off the Bay de Verde Peninsula, Newfoundland. Final report submitted to Department of Fisheries and Oceans (Newfoundland Region). 57 p.

O3 *Whitehead, H., P. Harcourt, and K. Ingham. 1979. The baleen whales in the ecosystem based upon the spawning capelin near the Bay de Verde Peninsula, Newfoundland. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 58 p.

P4 Winters, G. H. 1979. Reply to comment on production, mortality, and sustainable yield of Northwest Atlantic harp seals. J. Fish. Res. Board Can. 36: 1530-1532.

P3 Winters, G. H., and J. A. Moores. 1979. Prognosis of abundance and yield of eastern Newfoundland herring stocks. CAFSAC Res. Doc. 79/16. 34 p.

P3 Winters, G. H., and J. A. Moores. 1979. An evaluation of recent changes in the population dynamics of Southern Gulf herring. CAFSAC Res. Doc. 79/28. 34 p.

P3 Winters, G. H., and J. A. Moores. 1979. Estimation of biomass and yield of the St. Mary's-Placentia herring stock complex. CAFSAC Res. Doc. 79/36. 15 p.

## PUBLICATIONS - 1980

E3 Akenhead, S. A. 1980. The effects of ocean climate variability on temperate marine fish stocks, p. 59-61. In Proc. COP Oceans and Fisheries-Climate Workshop, Halifax, N.S., March 4-5, 1980.

E3 Akenhead, S. A. 1980. The development and distribution of Calanus finmarchicus on Flemish Cap in the spring of 1979. NAFO SCR Doc. 80/131, Ser. No. N228. 17 p.

E3 Anderson, J. T. 1980. Seston and phytoplankton data from Hudson Bay, 1975. CCIW OAS Central Region Tech. Note Series No. 80-2: 76 p.

E3 Anderson, J. T. 1980. The chlorophyll α regime on the Flemish Cap, April-May 1979. NAFO SCR Doc. 80/154, Ser. No. N227. 7 p.

E3 Anderson, J. T., and A. Chumakov. 1980. Historical data summary for the Flemish Cap Project (Division 3M). NAFO SCR Doc. 80/152, Ser. No. N224. 18 p.

E1 Anderson, J. T., and J. C. Roff. 1980. Seston ecology of the surface waters of Hudson Bay. Can. J. Fish. Aquat. Sci. 37: 2242-2253.

E1 Anderson, J. T., and J. C. Roff. 1980. Subsurface chlorophyll α maximum in Hudson Bay. Nat. Can. (Que.) 107: 207-213.

O3 Anon. 1980. [Edited by L. W. Coady and D. J. Scarratt] Brief prepared for the Newfoundland and Labrador Royal Commission on Forest Protection and Management. Department of Fisheries and Oceans, Research and Resource Services, St. John's, Newfoundland. 104 p.

G3 Atkinson, D. B. 1980. Weight-length relationships of roundnose grenadier in Subareas 0+1 and 2+3. NAFO SCR Doc. 80/83, Ser. No. N137. 5 p.

G3 Atkinson, D. B. 1980. Length measurements of roundnose grenadier (Macrourus rupestris) in the Northwest Atlantic. NAFO SCR Doc. 80/84, Ser. No. N138. 5 p.

G3 Atkinson, D. B. 1980. Assessment of the roundnose grenadier stocks in Subareas 0+1 and 2+3. NAFO SCR Doc. 80/100, Ser. No. N135. 7 p.

G3 Atkinson, D. B., W. D. McKone, and W. E. Legge. 1980. 3P redfish assessment. CAFSAC Res. Doc. 80/62. 29 p.

E2 Beardmore, J. A., C. J. Barker, B. Battaglia, R. J. Berry, A. Crosby-Longwell, J. F. Payne, and A. Rosenfield. 1980. The use of genetical approaches to monitoring biological effects of pollution, p. 299-305. In A. D. McIntyre and J. B. Pearce [ed.] Biological effects of marine pollution and the problems of monitoring. Rapp. P.-V. Reun. Cons. int. Explor. Mer 179.

P3 Beck, P. C., E. G. Dawe, and J. Drew. 1980. Breakdown of 1979 squid catches in Subarea 3 and Division 4R, with length and sex compositions from offshore and Newfoundland inshore commercial samples. NAFO SCR Doc. 80/34, Ser. No. N065. 15 p.

G3 Bishop, C. A. 1980. Analytical assessment of the cod stock in Divisions 3NO. NAFO SCR Doc. 80/49, Ser. No. N081. 18 p.

G3 Bishop, C. A. 1980. Status of the cod stock in Divisions 3Pn 4RS. CAFSAC Res. Doc. 80/27. 28 p.

G3 Bishop, C. A. 1980. Status of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 80/48. 20 p.

P1 Bowen, W. D. 1980. Coyote-golden eagle interactions at an ungulate carcass. J. Mammal. 61: 376-377 [non-aquatic publication prepared by researcher while on staff].

P1 Bowen, W. D., and I. McTaggart Cowan. 1980. Scent marking in coyotes. Can. J. Zool. 58: 473-480 [non-aquatic publication prepared by researcher while on staff].

P3 Bowen, W. D., and D. E. Sergeant. 1980. Estimates of harp seal pup production from mark-recapture experiments. NAFO SCR Doc. 80/162, Ser. No. N249. 14 p.

G1 Bowering, W. R. 1980. Fecundity of Greenland halibut, Reinhardtius hippoglossoides (Walbaum), from southern Labrador and southeastern Gulf of St. Lawrence. J. Northw. Atl. Fish. Sci. 1: 39-43.

G3 Bowering, W. R. 1980. The witch fishery on the southern Grand Bank (Divisions 3NO). NAFO SCR Doc. 80/95, Ser. No. N130. 15 p.

G3 Bowering, W. R. 1980. Stock assessment and abundance of Greenland halibut in the Canadian North Atlantic (Subarea 2 and Divisions 3K and 3L). NAFO SCR Doc. 80/96, Ser. No. N151. 26 p.

G3 Bowering, W. R. 1980. The Greenland halibut fishery in the Gulf of St. Lawrence. CAFSAC Res. Doc. 80/24. 18 p.

G3 Bowering, W. R., and J. Baird. 1980. Greenland halibut and witch flounder on the Flemish Cap (Division 3M). NAFO SCR Doc. 80/85, Ser. No. N139. 11 p.

G3 Bowering, W. R., and J. Baird. 1980. Estimates of stock biomass and long-term mortality of the northern witch flounder stock (Divisions 2J+3KL). NAFO SCR Doc. 80/108, Ser. No. N164. 14 p.

G3 Bowering, W. R., and J. Baird. 1980. Trends in stock structure of witch flounder on St. Pierre Bank from biomass surveys. CAFSAC Res. Doc. 80/35. 12 p.

G3 Bowering, W. R., and W. Brodie. 1980. An evaluation of recent management strategy for witch in the Gulf of St. Lawrence (NAFO Divisions 4RS). CAFSAC Res. Doc. 80/49. 20 p.

G3 Brodie, W. B., and T. K. Pitt. 1980. Assessment of yellowtail flounder in Divisions 3LNO. NAFO SCR Doc. 80/94, Ser. No. N149. 10 p.

P3 Carscadden, J. E., and D. S. Miller. 1980. Estimates of tilt angle of capelin using underwater photographs. ICES C.M.1980/H:50. 7 p.

P3 Carscadden, J. E., and D. S. Miller. 1980. Analytical and acoustic assessments of the capelin stock in Subarea 2 and Division 3K, 1979. NAFO SCR Doc. 80/13, Ser. No. N045. 19 p.

P3 Carscadden, J. E., and D. S. Miller. 1980. Estimation of natural mortality of Newfoundland capelin using the Icelandic method. NAFO SCR Doc. 80/45, Ser. No. N077. 8 p.

PE1 Carscadden, J. E., and R. K. Misra. 1980. Multivariate analysis of meristic characters of capelin (Mallotus villosus) in the Northwest Atlantic. Can. J. Fish. Aquat. Sci. 37: 725-729.

P3 Carscadden, J. E., and G. H. Winters. 1980. An alternate method of assessing the capelin stock in Divisions 2J+3K, using SCAM and catch-per-unit-effort. NAFO SCR Doc. 80/15, Ser. No. N047. 7 p.

F3 Chadwick, E.M.P. 1980. Atlantic salmon kelt (Salmo salar L.) as an index of spawners. ICES C.M.1980/M:29. 9 p.

G1 Christensen, O., and W. H. Lear. 1980. Distribution and abundance of Atlantic salmon at West Greenland. Rapp. P.-V. Reun. Cons. int. Explor. Mer 176: 22-35.

E1 Cone, D. K. 1980. The monogenea of some freshwater fishes in New Brunswick, Canada. J. Parasitol. 66: 178-180.

E1 Cone, D. K., J. D. Miller, and W. K. Austin. 1980. The pathology of "saddle-back" disease of underyearling Atlantic salmon (Salmo salar). Can. J. Zool. 58: 1283-1287.

P3 Dawe, E. G., and P. C. Beck. 1980. Assessment of the short-finned squid (Illex illecebrosus) in Subarea 3 for 1979. NAFO SCR Doc. 80/35, Ser. No. N066. 13 p.

F3 Dempson, J. B. 1980. Present status of pink salmon (Oncorhynchus gorbuscha) in the Newfoundland region. ICES C.M.1980/M:27. 6 p.

F3 Dempson, J. B. 1980. Application of a stock-recruitment model to assess the Labrador Atlantic salmon fishery. ICES C.M.1980/M:28. 15 p.

P3 Doubleday, W. G., and W. D. Bowen. 1980. Inconsistencies in reading the age of harp seal (Pagophilus groenlandicus) teeth, their consequences, and a means of reducing resulting biases. NAFO SCR Doc. 80/160, Ser. No. N247. 24 p.

F3 Doubleday, W. G., and D. G. Reddin. 1980. Gear selectivity and escapement mortality of Atlantic salmon in drift nets at West Greenland. CAFSAC Res. Doc. 80/11. 10 p.

P1 Ennis, G. P. 1980. Size-maturity relationships and related observations in Newfoundland populations of the lobster (Homarus americanus). Can. J. Fish. Aquat. Sci. 37: 945-956.

P3 Ennis, G. P. 1980. Recent and current Canadian research on growth of lobsters in the wild, p. 9-15. In V. C. Anthony and J. F. Caddy [ed.] Proceedings of the Canada-U.S. Workshop on Status of Assessment Science for N.W. Atlantic Lobster (Homarus americanus) Stocks, St. Andrews, N.B., Oct. 24-26, 1978. Can. Tech. Rep. Fish. Aquat. Sci. 932.

P3 Ennis, G. P. 1980. Canadian efforts to assess yield per recruit in lobsters, p. 45-48. In V. C. Anthony and J. F. Caddy [ed.] Proceedings of the Canada-U.S. Workshop on Status of Assessment Science for N.W. Atlantic Lobster (Homarus americanus) Stocks, St. Andrews, N.B., Oct. 24-26, 1978. Can. Tech. Rep. Fish. Aquat. Sci. 932.

P3 Ennis, G. P. 1980. Fecundity of the lobster, Homarus americanus, in Newfoundland waters. CAFSAC Res. Doc. 80/17. 9 p.

P3 Ennis, G. P. 1980. Further yield per recruit analyses for Newfoundland lobsters. CAFSAC Res. Doc. 80/39. 14 p.

EG1 Fairbairn, D. J., and D. A. Roff. 1980. Testing genetic models of isozyme variability without breeding data: can we depend on the $\chi^2$? Can. J. Fish. Aquat. Sci. 37: 1149-1159.

P4 Frishman, Z., A. Noonan, K. S. Naidu, and F. M. Cahill. 1980. Farming scallops in Newfoundland, Canada: a cost-benefit analysis. [Third Scallop Workshop, 13-16 May 1980, Port Erin, Isle of Man] Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 28 p.

G3 Gavaris, C. A. 1980. An update of the Flemish Cap redfish assessment. NAFO SCR Doc. 80/88, Ser. No. N142. 4 p.

G3 Gavaris, C. A. 1980. Assessment of redfish in Division 3O. CAFSAC Res. Doc. 80/26. 6 p.

G3 Gavaris, C. A., and W. D. McKone. 1980. An assessment of Subarea 2 + Division 3K redfish. CAFSAC Res. Doc. 80/25. 14 p.

G1 Gavaris, S. 1980. Use of a multiplicative model to estimate catch rate and effort from commercial data. Can. J. Fish. Aquat. Sci. 37: 2272-2279.

G3 Gavaris, S. 1980. Assessment of the cod stock in Divisions 3NO. NAFO SCR Doc. 80/24, Ser. No. N056. 6 p.

G3 Gavaris, S. 1980. Assessment of the cod stock in Division 3M. NAFO SCR Doc. 80/29, Ser. No. N057. 8 p.

G3 Gavaris, S. 1980. Assessment of the cod stock in NAFO Divisions 2J+3KL. NAFO SCR Doc. 80/81, Ser. No. N135. 5 p.

G3 Gavaris, S. 1980. Assessment of the cod stock in Subdivision 3Pn and Divisions 4R and 4S. CAFSAC Res. Doc. 80/28. 8 p.

G3 Gavaris, S. 1980. Assessment of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 80/29. 7 p.

G3 Gavaris, S., and C. A. Bishop. 1980. Assessment of the cod stock in Divisions 2GH. CAFSAC Res. Doc. 80/63. 9 p.

E1 Gerrath, J., J. C. Roff, and J. T. Anderson. 1980. Phytoplankton of freshwater origins in Hudson Bay. Nova Hedwigia, Band XXXII, Braunschweig 1980: 167-183.

F1 Gibson, R. J., and F. G. Whoriskey. 1980. An experiment to induce anadromy in wild brook trout in a Québec river on the North Shore of the Gulf of St. Lawrence. Nat. Can. (Que.) 107: 101-110.

E1 Hanessian, S., and J. Banoub. 1980. 1,2-orthoester formation and glycosidation with amide acetals. Methods Carbohydr. Chem. 8: 237-242.

E1 Hanessian, S., and J. Banoub. 1980. Preparation of 1,2-trans-glycosides in the presence of stannic chloride. Methods Carbohydr. Chem. 8: 243-246.

E1 Hanessian, S., and J. Banoub. 1980. Preparation of 1,2-trans-glycosides in the presence of silver trifluoromethanesulphonate. Methods Carbohydr. Chem. 8: 247-250.

P3 Hay, K. A. 1980. Age determination of the narwhal, Monodon monoceros L. Rep. Int. Whaling Comm. Special Issue 3: 119-132.

P4 Hurley, G. V. 1980. Recent developments in the squid, Illex illecebrosus, fishery of Newfoundland, Canada. Mar. Fish. Rev. 42(7-8): 15-22.

P3 Hurley, G. V. 1980. An examination of criteria for the short-term forecasting of inshore abundance of squid (Illex illecebrosus) at Newfoundland. NAFO SCR Doc. 80/5, Ser. No. N031. 18 p.

P3 Hurley, G. V., and P. Beck. 1980. The observation of growth rings in statoliths from the ommastrephid squid, Illex illecebrosus. NAFO SCR Doc. 80/1, Ser. No. N027. 17 p.

P3 Hurley, G. V., and E. G. Dawe. 1980. Tagging studies on squid (Illex illecebrosus) in the Newfoundland area. NAFO SCR Doc. 80/33, Ser. No. N072. 11 p.

F3 Jamieson, A. 1980. The cage rearing of rainbow trout in a brackish water pond in Newfoundland, 1978. Can. Ind. Rep. Fish. Aquat. Sci. 115: iv + 18 p.

G1 Jensen, J. M., and W. H. Lear. 1980. Atlantic salmon caught in the Irminger Sea and at East Greenland. J. Northw. Atl. Fish. Sci. 1: 55-64.

E3 Kendaris, T. A. 1980. Physical and biological oceanographic observations in Logy Bay, Newfoundland: April-September 1979. Can. MS Rep. Fish. Aquat. Sci. 1569: iv + 60 p.

E3 Kiceniuk, J. W. 1980. Effects of long term crude oil exposure on marine fish, p. 212-222. In Proc. 1980 Workshop on Research in the Labrador Coastal and Offshore Region, Goose Bay, Labrador, Sept. 4-6, 1980.

E1 Kiceniuk, J. W., G. L. Fletcher, and R. Misra. 1980. Physiological and morphological changes in a cold torpid marine fish upon acute exposure to petroleum. Bull. Environ. Contam. Toxicol. 24: 313-319.

G4 Kulka, D. W. 1980. Observer Program Training Manual, Newfoundland Region. Department of Fisheries and Oceans, St. John's, Newfoundland. 80 p.

G1 Lear, W. H. 1980. Food of Atlantic salmon in the West Greenland-Labrador Sea area. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 176: 55-59.

G2 Lear, W. H. 1980. The pink salmon transplant experiment in Newfoundland, p. 213-243. In J. E. Thorpe [ed.] Salmon ranching. Academic Press, London.

G3 Lear, W. H. 1980. Morphometrics, meristics and gonad development of Arctic cod from northern Labrador during September, 1978. CAFSAC Res. Doc. 80/7. 16 p.

G1 Lear, W. H., and O. Christensen. 1980. Selectivity and relative efficiency of salmon drift nets. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 176: 36-42.

G3 Lear, W. H., A. M. Fleming, and R. Wells. 1980. Results of small cod surveys in eastern Newfoundland during 1959-64. NAFO SCR Doc. 80/144, Ser. No. N218. 11 p.

G01 Lear, W. H., and E. J. Sandeman. 1980. Use of scale characters and discriminant functions for identifying continental origin of Atlantic salmon. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 176: 68-75.

G3 Lear, W. H., R. Wells, and W. Templeman. 1980. Variations in vertebral averages of year-classes of cod from Flemish Cap. NAFO SCR Doc. 80/145, Ser. No. N219. 7 p.

F3 LeDrew, L. J. 1980. Research on the Arctic char fishery of northern Labrador. Can. MS Rep. Fish. Aquat. Sci. 1589: iv + 10 p.

03 *Lien, J. 1980. Final report: whale entrapment in inshore fishing gear in Newfoundland. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 316 p.

G3 Lilly, G. R. 1980. Year-class strength of redfish and growth of cod on Flemish Cap. ICNAF Sel. Pap. 6: 35-40 [also ICNAF Res. Doc. 79/74, Ser. No. 5416].

G3 Lilly, G. R. 1980. Distribution and relative abundance of juvenile redfish (Sebastes sp.) on the Flemish Cap in 19[illegible]-80 based on information from cod stomachs. NAFO SCR Doc. 80/143, Ser. No. N217. 9 p.

G3 Lilly, G. R. 1980. The food of Arctic cod, Boreogadus saida (Lepechin), off Labrador in autumn, 1978. CAFSAC Res. Doc. 80/4. 11 p.

G3 Lilly, G. R. 1980. Relationships among otolith height, otolith length and body length in Arctic cod, Boreogadus saida (Lepechin), from Labrador. CAFSAC Res. Doc. 80/6. 4 p.

03 *MacLaren Marex Inc. 1980. Report on supplementary investigations in aid of the International Flemish Cap Project Task 2: Nutrient and phytoplankton studies. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 28 p.

03 *MacLaren Marex Inc. 1980. Analysis of bias and variance in the use of the Matoda splitter. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 8 p.

03 *MacLaren Marex Inc. 1980. Differential shrinkage in larval redfish preserved in alcohol and formalin. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 5 p.

G3 McGurk, M. D., J. M. Green, W. D. McKone, and K. Spencer. 1980. Condition indices, energy density and water and lipid content of Atlantic herring (Clupea harengus harengus) of southeastern Newfoundland. Can. Tech. Rep. Fish. Aquat. Sci. 958: iv + 41 p.

G3 McKone, W. D. 1980. Assessment of redfish in Divisions 3LN. NAFO SCR Doc. 80/80, Ser. No. N134. 9 p.

G3 McKone, W. D., D. B. Atkinson, and W. E. Legge. 1980. Gulf of St. Lawrence redfish assessment. CAFSAC Res. Doc. 80/60. 43 p.

G3 McKone, W. D., and W. Legge. 1980. Evidence for using otoliths to age redfish. NAFO SCR Doc. 80/79, Ser. No. N133. 7 p.

EP1 Mercer, M. C., R. K. Misra, and G. V. Hurley. 1980. Sex determination of the onmastrephid squid Illex illecebrosus using beak morphometrics. Can. J. Fish. Aquat. Sci. 37: 283-286.

P3 Miller, D. S. 1980. Hydroacoustic assessment of pelagic fish stocks in the Newfoundland and Labrador areas. ICES C.M.1980/H:51. 10 p.

P3 Miller, D. S., and J. E. Carscadden. 1980. An acoustic survey of capelin (Mallotus villosus) in Divisions 3LNO, 1979. NAFO SCR Doc. 80/14, Ser. No. N046. 8 p.

E1 Misra, R. K. 1980. Statistical comparisons of several growth curves of the von Bertalanffy type. Can. J. Fish. Aquat. Sci. 37: 920-926.

E1 Misra, R. K. 1980. Discriminant functions of linear comparisons of means when covariance matrices are unequal. Biom. J. 22: 755-758.

P3 Moores, J. A. 1980. The herring resource of eastern Canada, p. 179-206. In B. R. Melteff and V. G. Wespestad [ed.] Proc. Alaska Herring Symp. Alaska Sea Grant Rep. 80-4.

P3 Moores, J. A. 1980. Population dynamics and biological characteristics of the Newfoundland west coast herring stock. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 82 p.

P3 Moores, J. A., and G. H. Winters. 1980. An assessment of the status of the Newfoundland west coast herring stock. CAFSAC Res. Doc. 80/51. 25 p.

P3 Moores, J. A., and G. H. Winters. 1980. An evaluation of the current status of the St. Mary's-Placentia Bay herring stock. CAFSAC Res. Doc. 80/75. 22 p.

F3 Moores, R. B., and E. G. Dawe. 1980. Atlantic salmon commercial catch data, Newfoundland and Labrador, 1979. Can. Data Rep. Fish. Aquat. Sci. 221: iv + 95 p.

F3 Moores, R. B., E. G. Dawe, and E.M.P. Chadwick. 1980. The Atlantic salmon resource in Newfoundland and Labrador: an angler's view. Can. MS Rep. Fish. Aquat. Sci. 1590: iv + 37 p.

FE3 Moores, R. B., and R. J. Tucker. 1980. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1979. Can. Data Rep. Fish. Aquat. Sci. 212: xiv + 86 p.

P4 Naidu, K. S. 1980. Preliminary observations on the effect of substrate color on larval settlement in the sea scallop, Placopecten magellanicus (Abstract). Proc. Natl. Shellfish. Assoc. 70: 128.

P4 Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1980. Preliminary results of St. Pierre Bank scallop survey. Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 18 p.

P4 Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1980. Scallop culture report, 1979-80. Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 41 p.

P1 Nakashima, B. S., and W. C. Leggett. 1980. Natural sources and requirements of phosphorus for fishes. Can. J. Fish. Aquat. Sci. 37: 679-686.

P1 Nakashima, B. S., and W. C. Leggett. 1980. The role of fishes in the regulation of phosphorus availability in lakes. Can. J. Fish. Aquat. Sci. 37: 1540-1549.

G3 Ni, I-H. 1980. Separation of sharp beaked redfish, Sebastes fasciatus and S. mentella, by the morphology of extrinsic gasbladder musculature. NAFO SCR Doc. 80/112, Ser. No. N168. 12 p.

FE3 Nickerson, S., P. M. Ryan, G. Somerton, and J. Wright. 1980. A computer program for processing fish age and growth data. Can. Tech. Rep. Fish. Aquat. Sci. 964: iv + 20 p.

P3 Parsons, D. G. 1980. Canadian observations on the shrimp fishery at West Greenland in 1980. NAFO SCR Doc. 80/165, Ser. No. N252. 8 p.

P3 Parsons, D. G., G. E. Tucker, and P. J. Veitch. 1980. Status of the Labrador pink shrimp resources, Divisions 2H and 2J. CAFSAC Res. Doc. 80/14. 44 p.

P3 Parsons, D. G., and P. J. Veitch. 1980. Information on catch and catch per unit effort for shrimp, Pandalus borealis, off West Greenland, 1980. NAFO SCR Doc. 80/167, Ser. No. N254. 19 p.

E2 Payne, J. F. 1980. A review of the effect of oil and grease in the marine environment, p. 51-72. In J. J. Swiss, R. F. Addison, D. W. McLeese, and J. F. Payne. Regulated levels of Schedule I substances in the Ocean Dumping Control Act - a review. Ocean Dumping Rep. 3.

E2 Payne, J. F., and I. Martins. 1980. Monitoring for mutagenic compounds in the marine environment, p. 292-298. In A. D. McIntyre and J. B. Pearce [ed.] Biological effects of marine pollution and the problems of monitoring. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 179.

E2 Payne, J. F., I. Martins, D. Fagan, and A. Rahimtula. 1980. Mutagens in aquatic environments: water chlorination and petroleum sources of polycyclic aromatics as major contributors, p. 845-850. In R. L. Jolley, W. A. Brungs, and R. B. Cumming [ed.] Water chlorination: environmental impact and health effects, Vol. 3, Chap 74. Ann Arbor Science, Michigan.

F1 Payne, R. H. 1980. The use of serum transferrin polymorphism to determine the stock composition of Atlantic salmon in the West Greenland fishery. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 176: 60-64.

F1 Pippy, J.H.C. 1980. The value of parasites as biological tags in Atlantic salmon at West Greenland. Rapp. P.-V. Reun. Cons. Int. Explor. Mer 176: 76-81.

F3 Pippy, J.H.C. 1980. Canada, p. 1-11. In Administrative Report of the Anadromous and Catadromous Fish Committee. ICES C.M.1980/M:1.

G3 Pitt, T. K. 1980. American plaice in Subdivision 3Ps an assessment update. CAFSAC Res. Doc. 80/53. 25 p.

G3 Pitt, T. K. 1980. An assessment update of American plaice in ICNAF Subarea 2 and Division 3K. CAFSAC Res. Doc. 80/58. 13 p.

G3 Pitt, T. K., and W. B. Brodie. 1980. Assessment of American plaice on the Grand Bank. NAFO SCR Doc. 80/110, Ser. No. N166. 14 p.

F4 Porter, R. 1980. Search the high seas. Atl. Salmon J./Spawner 29(3): 30-31.

E3 Radtke, R. L. 1980. The formation and growth of otoliths from redfish (Sebastes spp.) larvae from the Flemish Cap (Division 3M). NAFO SCR Doc. 80/153, Ser. No. N225. 6 p.

E3 Radtke, R. L., and K. G. Walwood. 1980. Otolith formation and body shrinkage due to fixation in larval cod (Gadus morhua). Can. Tech. Rep. Fish. Aquat. Sci. 929: iii + 10 p.

F3 Reddin, D. G. 1980. Change in weight of Atlantic salmon from the West Greenland to home waters fisheries. ICES C.M.1980/M:22. 10 p. [also CAFSAC Res. Doc. 80/81].

F3 Reddin, D. G. 1980. Change in weight of Atlantic salmon at West Greenland and its relationship to numbers of fish caught per tonne. ICES C.M.1980/M:23. 6 p. [also CAFSAC Res. Doc. 80/91].

F3 Reddin, D. G. 1980. Mortality fishing mortality at West Greenland and in home water fisheries. ICES C.M.1980/M:24. 12 p. [also CAFSAC Res. Doc. 80/101].

F4 Reddin, D. G., and R. F. Burfitt. 1980. The West Greenland fishery. Atl. Salmon J./Spawner 29(3): 38-39.

F3 Reddin, D. G., and R. F. Burfitt. 1980. The stock composition of Atlantic salmon off West Greenland in 1979. ICES C.M.1980/M:25. 8 p.

F3 Reddin, D. G., and F. A. Day. 1980. 1969-72 Newfoundland and Labrador Atlantic salmon (Salmo salar) commercial catch data. Can. Data Rep. Fish. Aquat. Sci. 220: iv + 55 p.

F2 Ritter, J. A., Y. Côté, T. R. Porter, and B. Tétreault. 1980. Issues and promises for Atlantic salmon management in Canada, p. 108-127. In A.E.J. Went [ed.] Atlantic salmon: its future. Fishing News Books Ltd., Farnham.

F3 Ritter, J. A., T. L. Marshall, D. G. Reddin, and W. G. Doubleday. 1980. Assessment of the impact of the West Greenland Atlantic salmon (Salmo salar) fishery on stocks and catches in North America. ICES C.M.1980/M:38. 10 p. [also CAFSAC Res. Doc. 80/121].

G3 Rivard, D., S. Stevenson, and K. Zwanenburg. 1980. 1979 performance of commercial sampling for east coast Canadian fisheries. CAFSAC Res. Doc. 80/70. 29 p.

G1 Roff, D. A. 1980. Optimizing development time in a seasonal environment: the 'ups and downs' of clinal variation. Oecologia 45: 202-208.

G1 Roff, D. A. 1980. A motion for the retirement of the von Bertalanffy function. Can. J. Fish. Aquat. Sci. 37: 127-129.

GP3 Roff, D. A., and W. D. Bowen. 1980. One, two, many: how many harp seals are there? NAFO SCR Doc. 80/161, Ser. No. N248. 24 p.

GE1 Roff, D. A., and D. J. Fairbairn. 1980. An evaluation of Gulland's method for fitting the Schaefer model. Can. J. Fish. Aquat. Sci. 37: 1229-1235.

F3 Ryan, P. M. 1980. Fishes of the Lower Churchill River, Labrador. Fish. Mar. Serv. Tech. Rep. 922: vii + 189 p.

F1 Ryan, P. M., and H. H. Harvey. 1980. Growth responses of yellow perch, Perca flavescens (Mitchill), to lake acidification in the La Cloche mountain lakes of Ontario. Environ. Biol. Fishes 5: 97-108.

03 Sandeman, E. J., J. S. Scott, and J. Boulva. 1980. Canadian research report, 1979. NAFO SCS Doc. 80/28, Ser. No. N193. 14 p.

E2 Senciall, I. R., S. Rahal, and A. C. Dey. 1980. G-21 and 6α-hydroxylation of progesterone by solubilized rabbit hepatic microsomal fractions: nonobligatory requirement for cytochrome $P_{450}$. p. 749-752. In M. J. Coon, R. Estabrook, and P. J. O'Brien [ed.] Microsomes, drug oxidations, and chemical carcinogenesis. Academic Press, N.Y.

E1 Shaw, D. H., and M. J. Squires. 1980. Optional production and utilization of polysaccharide by Aeromonas hydrophila. Arch. Microbiol. 125: 83-87.

G1 Smith, S. J. 1980. Comparison of two methods of estimating the variance of the estimate of catch per unit effort. Can. J. Fish. Aquat. Sci. 37: 2346-2351.

G3 Stevenson, S. C. 1980. Summary of discarding and estimates of the total removals by Canadian trawlers in the American plaice fishery of Divisions 3LNO during 1978 and 1979. NAFO SCR Doc. 80/86, Ser. No. N140. 10 p.

E3 Swiss, J. J., R. F. Addison, D. W. McLeese, and J. F. Payne. 1980. Regulated levels of Schedule I substances in the Ocean Dumping Control Act - a review. Ocean Dumping Rep. 3: 73 p.

01 *Templeman, W. 1980. Incidence of subcaudal melanophores in pre-extrusion larvae of redfish species in the Newfoundland-Labrador area. J. Northw. Atl. Fish. Sci. 1: 7-19.

03 *Templeman, W. 1980. A study of vertebral numbers of Atlantic cod. Report submitted to Department of Fisheries and Oceans (Newfoundland Region).

03 *Threlfall, W. 1980. A study of the potential of nematodes and other parasites of the squid (Illex illecebrosus) as biological tags. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 11 p.

P3 Veitch, P. J., D. G. Parsons, and E. Way. 1980. Shrimp investigations Ungava Bay-eastern Hudson Strait and Division 2G. CAFSAC Res. Doc. 80/15. 21 p.

G3 Wells, R. 1980. Estimation of total mortality of cod on the Flemish Cap in 1978 and 1979 from Canadian research vessel survey data. NAFO SCR Doc. 80/26, Ser. No. N058. 3 p.

G3 Wells, R. 1980. Distribution and abundance of cod on the Flemish Cap, January 1980. NAFO SCR Doc. 80/27, Ser. No. N059. 7 p.

G3 Wells, R. 1980. Changes in the size and age composition of the cod stock in Division 3M during 1959-79. NAFO SCR Doc. 80/28, Ser. No. N060. 18 p.

G3 Wells, R. 1980. Status of the cod stock in Divisions 2J+3KL in 1978. NAFO SCR Doc. 80/63, Ser. No. N102. 5 p.

G3 Wells, R. 1980. Age and growth of Arctic cod (Boreogadus saida) taken off Labrador in September 1978. CAFSAC Res. Doc. 80/5. 4 p.

G3 Wells, R., and C. A. Bishop. 1980. Some recent changes in the status of the cod stock in Divisions 2J+3KL. NAFO SCR Doc. 80/101, Ser. No. N156. 15 p.

P3 Wheeler, J. P., and G. H. Winters. 1980. Analysis of stock size and yield of east coast Newfoundland herring stock. CAFSAC Res. Doc. 80/52. 46 p.

01 *Whitehead, H., P. Harcourt, K. Ingham, and H. Clark. 1980. The migration of humpback whales past the Bay de Verde Peninsula, Newfoundland, during June and July, 1978. Can. J. Zool. 58: 687-692.

P3 Winters, G. H., J. E. Carscadden, and D. S. Miller. 1980. An indirect method of estimating maturation rates of cohorts of capelin. NAFO SCR Doc. 80/16, Ser. No. N048. 6 p.

P3 Winters, G. H., and J. A. Moores. 1980. An evaluation of the current status of Southern Gulf herring. CAFSAC Res. Doc. 80/54. 51 p.

P3 Winters, G. H., and J. A. Moores. 1980. Fortune Bay herring: a stock in the process of executing the limbo. CAFSAC Res. Doc. 80/76. 16 p.

## PUBLICATIONS - 1981

E3 Akenhead, S. A. 1981. Local sea-surface temperature and salinity on Flemish Cap. NAFO SCR Doc. 81/120, Ser. No. N426. 7 p.

E3 Akenhead, S. A. 1981. Fisheries oceanography and the nature of carrying capacity for larval marine fishes. NAFO SCR Doc. 81/142, Ser. No. N450. 27 p.

EPG3 Akenhead, S. A., J. Carscadden, H. Lear, G. R. Lilly, and R. Wells. 1981. On the cod-capelin interaction off northeast Newfoundland and Labrador. NAFO SCR Doc. 81/1, Ser. No. N264. 18 p.

EG3 Akenhead, S. A., and E. M. LeGrow. 1981. The vertebrates code of the Northwest Atlantic Fisheries Centre. Can. Data Rep. Fish. Aquat. Sci. 309: iv + 58 p.

E3 Akenhead, S. A., B. D. Petrie, C. K. Ross, and D. M. Ware. 1981. Ocean climate and the marine fisheries of Atlantic Canada: an assessment. BIO Rep. Series BI-R-81-8. 121 p.

E3 Anderson, J. T. 1981. Larval fish surveys on Flemish Cap, 1980. NAFO SCR Doc. 81/116, Ser. No. N422. 14 p.

E3 Anderson, J. T., and S. A. Akenhead. 1981. Distribution and abundance of redfish and cod larvae on Flemish Cap in 1978 and 1979. NAFO Sci. Coun. Studies 1: 57-63 (also NAFO SCR Doc. 80/150, Ser. No. N226).

E1 Anderson, J. T., J. C. Roff, and J. Garrath. 1981. The diatoms and dinoflagellates of Hudson Bay. Can. J. Bot. 59: 1793-1810.

O4 Anon. 1981. [Edited by L. W. Coady] Program Review and Evaluation (PRE) - 1980. Research and Resource Services, Department of Fisheries and Oceans, St. John's, Newfoundland. 319 p.

O4 Anon. 1981. Federal Fisheries Research 1931-1981. Decks Awash 10(6): 56 p.

G1 Atkinson, D. B. 1981. Partial length as a replacement for total length in measuring grenadiers. J. Northw. Atl. Fish. Sci. 2: 53-56.

G3 Atkinson, D. B. 1981. Assessment of roundnose grenadier in NAFO Subareas 2+3. NAFO SCR Doc. 81/60, Ser. No. N344. 12 p.

G4 Atkinson, D. B. 1981. Roundnose grenadier. Underwater World 81/007. 6 p.

G3 Atkinson, D. B., and C. A. Gavaris. 1981. Divisions 3LN redfish stock assessment. NAFO SCR Doc. 81/59, Ser. No. N343. 15 p.

G3 Atkinson, D. B., W. E. Legge, and P. Stead. 1981. The redfish stock in NAFO Division 3P. CAFSAC Res. Doc. 81/59. 21 p.

E1 Banoub, J. H., and D. H. Shaw. 1981. Isolation and characterization of 3-acetamido-3,6-dideoxy-L-glucose from the core oligosaccharides obtained from the aquatic gram negative bacteria Aeromonas hydrophila and Vibrio engulliarum. Can. J. Biochem. 59: 877-879.

E1 Banoub, J. H., and D. H. Shaw. 1981. Structural investigations on the core oligosaccharide of Aeromonas hydrophila (Chemotype III) lipopolysaccharide. Carbohydr. Res. 98: 93-103.

P3 Beck, P. C., E. G. Dawe, and J. Drew. 1981. Breakdown of squid (Illex illecebrosus) catches in NAFO Subarea 3 and Division 4R 1980, with length and sex composition from Newfoundland inshore commercial samples and early season offshore areas. NAFO SCR Doc. 81/27, Ser. No. N306. 17 p.

F3 Bietz, B. F., R. J. Gibson, and R. A. Cunjak. 1981. Resource competition between brown trout (Salmo trutta L.) and juvenile Atlantic salmon (Salmo salar L.) in Newfoundland. Report submitted by MacLaren Plansearch Limited to Department of Fisheries and Oceans (Newfoundland Region). 74 p.

G3 Bishop, C. A., and S. Gavaris. 1981. Stock assessment of cod in Division 3NO. NAFO SCR Doc. 81/11, Ser. No. N275. 28 p.

G3 Bishop, C. A., and S. Gavaris. 1981. Assessment of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 81/39. 27 p.

P1 Bowen, W. D. 1981. Variation in coyote social organization: the influence of prey size. Can. J. Zool. 59: 639-652 (non-aquatic publication prepared by researcher while on staff).

P3 Bowen, W. D. 1981. Harp seals and their foods: how do they interact? NAFO SCR Doc. 81/154, Ser. No. N461. 8 p.

P1 Bowen, W. D., C. K. Capstick, and D. E. Sergeant. 1981. Temporal changes in the reproductive potential of female harp seals (Pagophilus groenlandicus). Can. J. Fish. Aquat. Sci. 38: 495-503.

P3 Bowen, W. D., and D. E. Sergeant. 1981. Mean age at sexual maturity and age-specific pregnancy rates of Northwest Atlantic harp seals in 1980 and 1981. NAFO SCR Doc. 81/152, Ser. No. N459. 5 p.

P3 Bowen, W. D., and D. E. Sergeant. 1981. Further estimates of harp seal pup production between 1977 and 1980 from mark-recapture. NAFO SCR Doc. 81/153, Ser. No. N460. 6 p.

G3 Bowering, W. R. 1981. Witch flounder in the northern Gulf of St. Lawrence (NAFO Divisions 4RS). CAFSAC Res. Doc. 81/52. 12 p.

G3 Bowering, W. R. 1981. Witch flounder in NAFO Divisions 2J and 3KL - another by-catch. CAFSAC Res. Doc. 81/53. 16 p.

G3 Bowering, W. R. 1981. Witch flounder of St. Pierre Bank - a by-catch fishery. CAFSAC Res. Doc. 81/54. 12 p.

G3 Bowering, W. R. 1981. Greenland halibut in the Gulf of St. Lawrence - from immigrants to emigrants. CAFSAC Res. Doc. 81/55. 11 p.

G3 Bowering, W. R., and W. B. Brodie. 1981. Stock assessment of Greenland halibut in NAFO Subarea 2 and Divisions 3KL with projected catches for 1982. NAFO SCR Doc. 81/64, Ser. No. N348. 17 p.

GP3 Bowering, W. R., and D. G. Parsons. 1981. Observation on the relationships between shrimp (Pandalus borealis) and Greenland halibut (Reinhardtius hippoglossoides) in two Labrador channels. CAFSAC Res. Doc. 81/5. 23 p.

G3 Brodie, W. B. 1981. By-catches in five Grand Bank groundfish fisheries. CAFSAC Res. Doc. 81/68. 18 p.

G3 Brodie, W. B., and T. K. Pitt. 1981. An assessment of the yellowtail stock in Divisions 3LNO. NAFO SCR Doc. 81/54, Ser. No. N338. 9 p.

G3 Brodie, W. B., and T. K. Pitt. 1981. An assessment of American plaice in Subdivision 3Ps. CAFSAC Res. Doc. 81/37. 14 p.

P4 Carscadden, J. E. 1981. Capelin. Underwater World 81/010. 8 p.

P3 Carscadden, J., and D. S. Miller. 1981. Analytical assessment of the capelin stock in Subarea 2 + Div. 3K using SCAM. NAFO SCR Doc. 81/4, Ser. No. N268. 8 p.

P3 Carscadden, J., G. H. Winters, and D. S. Miller. 1981. Assessment of the Division 3L capelin stock, 1967-1980, using SCAM. NAFO SCR Doc. 81/3, Ser. No. N267. 13 p.

F3 Chadwick, E.M.P. 1981. Biological characteristics of Atlantic salmon smolts in Western Arm Brook, Newfoundland. Can. Tech. Rep. Fish. Aquat. Sci. 1024: iv + 45 p.

F3 Chadwick, E.M.P. 1981. A stock-recruitment relationship for Atlantic salmon in Western Arm Brook. CAFSAC Res. Doc. 81/16. 7 p.

F1 Chadwick, E.M.P., and W. J. Bruce. 1981. Range extension of steelhead trout (Salmo gairdneri) in Newfoundland. Nat. Can. (Que.) 108: 301-303.

O4 Coady, L. W. 1981. 50th Anniversary of fisheries research in Newfoundland. Pisces 2(5): 1-2.

E1 Cone, D. K. 1981. Gyrodactylus pleuronecti n. sp. (Monogenea) from winter flounder (Pseudopleuronectes americanus) in Newfoundland, Canada. Can. J. Zool. 59: 2241-2243.

E3 Cone, D. K. 1981. Skin lesions of Atlantic salmon (Salmo salar) in Newfoundland rivers. Can. Tech. Rep. Fish. Aquat. Sci. 1018: iv + 9 p.

E1 Cone, D. K., and M. Beverley-Burton. 1981. The surface topography of Benedenia sp. (Monogenea: Capsalidae). Can. J. Zool. 59: 1941-1946.

E1 Cone, D. K., and M.D.B. Burt. 1981. The invasion route of the gill parasite Urocleidus adspectus Mueller, 1936 (Monogenea: Ancyrocephalinae). Can. J. Zool. 59: 2166-2171.

E3 Cone, D. K., and A. R. Moore. 1981. The geographical distribution of infectious pancreatic necrosis virus (IPNV) infecting salmonids in central Newfoundland, Canada. Can. Tech. Rep. Fish. Aquat. Sci. 1043: iv + 7 p.

P1 Dawe, E. G. 1981. Development of the Newfoundland squid (Illex illecebrosus) fishery and management of the resource. J. Shellfish Res. 1: 137-142.

P1 Dawe, E. G. 1981. Overview of recent progress toward aging short-finned squid (Illex illecebrosus) using statoliths. J. Shellfish Res. 1: 193-195.

P3 Dawe, E. G. 1981. Further notes on distribution of young short-finned squid (Illex illecebrosus) in relation to water masses, February-March 1981. NAFO SCR Doc. 81/104, Ser. No. N406. 6 p.

P3 Dawe, E. G., P. C. Beck, and H. J. Drew. 1981. Distribution and biological characteristics of young short-finned squid (Illex illecebrosus) in the Northwest Atlantic, February 20-March 11, 1981. NAFO SCR Doc. 81/23, Ser. No. N302. 20 p.

P3 Dawe, E. G., P. C. Beck, H. J. Drew, and G. H. Winters. 1981. Long-distance migration of a short-finned squid (Illex illecebrosus). NAFO SCR Doc. 81/24, Ser. No. N303. 4 p.

P1 Dawe, E. G., P. C. Beck, H. J. Drew, and G. H. Winters. 1981. Long-distance migration of a short-finned squid, Illex illecebrosus. J. Northw. Atl. Fish. Sci. 2: 75-76.

P1 Dawe, E. G., and H. J. Drew. 1981. Record of a mature female short-finned squid, Illex illecebrosus, captured inshore at Newfoundland and previous captures of mature females in the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 2: 61-65.

P3 Dawe, E. G., and H. J. Drew. 1981. Historical records of mature female short-finned squid (Illex illecebrosus) from the Northwest Atlantic and the first record of a mature female captured inshore at Newfoundland. NAFO SCR Doc. 81/26, Ser. No. N305. 9 p.

P3 Dawe, E. G., and G. V. Hurley. 1981. Forecasting inshore abundance of short-finned squid (Illex illecebrosus) at Newfoundland. NAFO SCR Doc. 81/28, Ser. No. N307. 18 p.

PG3 Dawe, E. G., G. R. Lilly, and J. A. Moores. 1981. An examination of the influence of squid (Illex illecebrosus) on recruitment in several finfish stocks off eastern Newfoundland and Labrador. NAFO SCR Doc. 81/25, Ser. No. N304. 14 p.

F3 Dempson, J. B. 1981. Assessment of several northern Labrador Arctic charr stocks. CAFSAC Res. Doc. 81/14. 15 p.

E4 Dey, A. C., and D. Fairbairn. 1981. Muscle phosphoglucomutase of turbot (Greenland halibut) and witch (flounder) from North Atlantic and Gulf of St. Lawrence [Abstract]. Can. Fed. Biol. Soc. Proc. 24: 309.

E1 Dey, A. C., S. Rahal, R. L. Ramsay, and I. R. Sanclair. 1981. A simple procedure for the solubilization of NADH-cytochrome $b_5$ reductase. Anal. Biochem. 110: 373-379.

O3 *Dobrocky Seatech (Nfld.) Ltd. 1981. A review of existing environmental conditions at Holyrood Pond, St. Mary's Bay, in relation to a potential aquaculture venture. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 26 p.

F3 Doubleday, W. G., and D. G. Reddin. 1981. An analysis of the implications of alternative mesh sizes for gillnets and opening dates for the commercial salmon fishing season at West Greenland. CAFSAC Res. Doc. 81/3. 56 p.

P1 Ennis, G. P. 1981. Fecundity of the American lobster, Homarus americanus, in Newfoundland waters. Fish. Bull. 79: 796-800.

P3 Ennis, G. P. 1981. Variation in annual growth in a Newfoundland population of lobsters (Homarus americanus) in relation to temperature conditions. CAFSAC Res. Doc. 81/63. 6 p.

P3 Ennis, G. P. 1981. An examination of the effect of size and sex of animals tagged on estimates of exploitation rate in a Newfoundland population of lobster (Homarus americanus). CAFSAC Res. Doc. 81/64. 6 p.

P3 Ennis, G. P. 1981. Annual variation in standing stock in a Newfoundland population of lobsters, Homarus americanus. CAFSAC Res. Doc. 81/69. 12 p.

E1 Fairbairn, D. J. 1981. Biochemical genetic analysis of population differentiation in Greenland halibut (Reinhardtius hippoglossoides) from the Northwest Atlantic, Gulf of St. Lawrence, and Bering Sea. Can. J. Fish. Aquat. Sci. 38: 669-677.

E1 Fairbairn, D. J. 1981. Which witch is which? A study of the stock structure of witch flounder (Glyptocephalus cynoglossus) in the Newfoundland region. Can. J. Fish. Aquat. Sci. 38: 782-794.

E1 Fletcher, G. L., J. W. Kiceniuk, and U. P. Williams. 1981. Effects of oiled sediments on mortality, feeding and growth of winter flounder Pseudopleuronectes americanus. Mar. Ecol. Prog. Ser. 4: 91-96.

P3 Fréchette, J., and D. G. Parsons. 1981. Preliminary estimation of total mortality for shrimp (P. borealis) in the Anticosti Channel. CAFSAC Res. Doc. 81/82. 10 p.

G3 Gavaris, C. A. 1981. An assessment of redfish on the Flemish Cap. NAFO SCR Doc. 81/53, Ser. No. N337. 7 p.

G3 Gavaris, C. A. 1981. An assessment of redfish in Division 3O. CAFSAC Res. Doc. 81/38. 9 p.

G3 Gavaris, C. A. 1981. An assessment of redfish in Subarea 2 + Division 3K. CAFSAC Res. Doc. 81/50. 15 p.

G3 Gavaris, C. A., and W. E. Legge. 1981. Distribution and abundance of small redfish on the Flemish Cap. NAFO SCR Doc. 81/119, Ser. No. N425. 12 p.

G3 Gavaris, S. 1981. Assessment of the cod stock in Division 3M. NAFO SCR Doc. 81/12, Ser. No. N276. 17 p.

G3 Gavaris, S. 1981. Surplus production analysis for the cod stock in NAFO Divisions 2J+3KL. NAFO SCR Doc. 81/65, Ser. No. N349. 6 p.

G3 Gavaris, S., and C. Bishop. 1981. Assessment of cod stock in 3Pn4RS. CAFSAC Res. Doc. 81/47. 18 p.

F3 Gibson, R. J. 1981. Behavioural interactions between coho salmon (Oncorhynchus kisutch), Atlantic salmon (Salmo salar), brook trout (Salvelinus fontinalis) and steelhead trout (Salmo gairdneri), at the juvenile fluviatile stages. Can. Tech. Rep. Fish. Aquat. Sci. 1029: v + 116 p.

F1 Idler, D. R., S. J. Hwang, L. W. Crim, and D. Reddin. 1981. Determination of sexual maturation stages of Atlantic salmon (Salmo salar) captured at sea. Can. J. Fish. Aquat. Sci. 38: 405-413.

E3 Kendaris, T. A. 1981. The distribution of temperature, salinity and density on Flemish Cap (47°00'N, 45°00'W) in March, April and May 1979. Can. Data Rep. Fish. Aquat. Sci. 269: iv + 127 p.

E3 Kendaris, T. A. 1981. The distribution of temperature, salinity and density on Flemish Cap (47°00'N, 45°00'W) in April, May and July 1980. Can. Data Rep. Fish. Aquat. Sci. 270: iv + 173 p.

G1 Khan, R. A., J. Campbell, and H. Lear. 1981. Mortality in captive Atlantic cod, Gadus morhua, associated with fin rot disease. J. Wildl. Dis. 17: 521-527.

GE3 Khan, R. A., M. Dawe, R. Bowering, and R. K. Misra. 1981. Blood protozoa as an aid for separating stocks of Greenland halibut, Reinhardtius hippoglossoides (Walbaum) in the northwestern Atlantic. ICES C.M.1981/G:40. 14 p.

E3 Khan, R. A., J. Kiceniuk, M. Dawe, and U. Williams. 1981. Long term effects of crude oil on Atlantic cod. ICES C.M.1981/E:40. 10 p.

G3 Kulka, D. W. 1981. Observed by-catch in the Flemish Cap cod and redfish fisheries in 1979 and 1980 by Canadian observers. NAFO SCR Doc. 81/16, Ser. No. N292. 2 p.

G3 Kulka, D. W. 1981. An examination of the product form to whole weight conversion used by the foreign fleets in 1980 (Nfld. Observer Program). CAFSAC Res. Doc. 81/60. 38 p.

G4 Kulka, D. W. 1981. Analysis of the 1979 and 1980 shrimp fishery off Labrador, in Ungava Bay and the Baffin Strait. Research and Resource Services, Department of Fisheries and Oceans, St. John's, Nfld. [Report to Industry]. 41 p.

G3 Kulka, D. W., and W. T. Stobo. 1981. Winter distribution and feeding of mackerel on the Scotian Shelf and outer Georges Bank with reference to the winter distribution of other finfish species. Can. Tech. Rep. Fish. Aquat. Sci. 1038: iv + 38 p.

G4 Lear, W. H. 1981. Climate plays big part in the fishery. Evening Telegram (Forum), Sept. 19, p. 18.

G1 Lear, W. H., R. Wells, and W. Templeman. 1981. Variation in vertebral averages for year-classes of Atlantic cod, Gadus morhua, on Flemish Cap. J. Northw. Atl. Fish. Sci. 2: 57-60.

G3 Lilly, G. R. 1981. Distribution and relative abundance of juvenile redfish on the Flemish Cap in 1978-81 based on recoveries from cod stomachs. NAFO SCR Doc. 81/118, Ser. No. N424. 15 p.

G3 Lilly, G. R., and A. M. Fleming. 1981. Size relationships in predation by Atlantic cod, Gadus morhua, on capelin, Mallotus villosus, and sand lance, Ammodytes dubius, in the Newfoundland area. NAFO Sci. Coun. Studies 1: 41-45 [also NAFO SCR Doc. 80/155, Ser. No. N2301.

GP3 Lilly, G. R., R. Wells, and J. Carscadden. 1981. Estimates of the possible consumption of capelin by the cod stocks in Divisions 2J+3KL and 3NO. NAFO SCR Doc. 81/8, Ser. No. N272. 9 p.

G3 May, A. W., R. G. Halliday, R. Wells, and E. Dunne. 1981. Management of Canadian cod stocks. NAFO SCR Doc. 81/141, Ser. No. N449. 13 p. [also ICES C.M.1980/G:48].

G3 McKone, W. D. 1981. Effects of changes in codend mesh size upon yield per recruit of redfish in Division 3M. NAFO SCR Doc. 81/52, Ser. No. N336. 8 p.

G3 McKone, W. D., C. Gavaris, and W. E. Legge. 1981. Redfish assessment for Divisions 4RST. CAFSAC Res. Doc. 81/58. 18 p.

O4 Mercer, M. C. 1981. Do fisheries profit from fisheries science? The changing role of science in fisheries management. Text of speech to St. John's Board of Trade, October 28, 1981. 14 p.

P3 Miller, D. S., and J. E. Carscadden. 1981. Acoustic survey results for capelin (Mallotus villosus) in Divisions 2J3K and 3LNO, 1980. NAFO SCR Doc. 81/5, Ser. No. N269. 10 p.

P3 Miller, R. J., and P. G. O'Keefe. 1981. Seasonal and depth distribution, size, and molt cycle of the spider crabs, Chionoecetes opilio, Hyas araneus, and Hyas coarctatus in a Newfoundland bay. Can. Tech. Rep. Fish. Aquat. Sci. 1003: iv + 18 p.

P3 Moores, J. A., G. H. Winters, and C. I. Barbour. 1981. An examination of the status of the Newfoundland west coast herring stock. CAFSAC Res. Doc. 81/9. 37 p.

P3 Moores, J. A., G. H. Winters, and E. L. Dalley. 1981. Where have all the herring gone? The continued decline of the southeast Newfoundland herring stocks. CAFSAC Res. Doc. 81/75. 31 p.

FE3 Moores, R. B., and R. J. Tucker. 1981. Angled catch and effort data in the Atlantic salmon recreational fishery, Newfoundland and Labrador, 1980. Can. Data Rep. Fish. Aquat. Sci. 263: xiv + 85 p.

P1 Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1981. Relative efficacy of two artificial substrates on the collection of sea scallop (Placopecten magellanicus) spat. J. World Mariculture Soc. 12(2): 165-171.

P4 Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1981. Scallop culture report, 1980-81. Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 46 p.

P3 Nakashima, B. S. 1981. Sampling variation and survey design for capelin (Mallotus villosus) densities from an acoustic survey in Divisions 3LNO, 1980. NAFO SCR Doc. 81/14, Ser. No. N278. 8 p.

G1 Ni, I-H. 1981. Separation of sharp-beaked redfish, Sebastes fasciatus and S. mentella, from northeastern Grand Bank by morphology of extrinsic gasbladder musculature. J. Northw. Atl. Fish. Sci. 2: 7-12.

G1 Ni, I-H. 1981. Numerical classification of sharp-beaked redfishes, Sebastes mentella and S. fasciatus, from northeastern Grand Bank. Can. J. Fish. Aquat. Sci. 38: 873-879.

G3 Ni, I-H. 1981. Application of factor analysis in redfish morphological studies. ICES C.M.1981/G:39. 14 p.

G3 Ni, I-H. 1981. The use of vertebrae frequencies to indicate the distribution of sharp-beaked redfish, Sebastes mentella and S. fasciatus. NAFO SCR Doc. 81/70, Ser. No. N354. 17 p.

G3 Ni, I-H. 1981. The use of anal fin ray frequencies to indicate the stock units of deepwater redfish, Sebastes mentella, and rosefish, S. fasciatus. NAFO SCR Doc. 81/80, Ser. No. N365. 14 p.

P3 Parsons, D. G. 1981. Gear selectivity in the Labrador shrimp fishery. CAFSAC Res. Doc. 81/43. 7 p.

PG2 Parsons, D. G., and E. J. Sandeman. 1981. Groundfish survey techniques as applied to abundance surveys for shrimp, p. 124-146. In W. G. Doubleday and D. Rivard [ed.] Bottom trawl surveys. Can. Spec. Publ. Fish. Aquat. Sci. 58.

P3 Parsons, D. G., G. E. Tucker, and P. J. Veitch. 1981. Estimates of potential yield for shrimp (Pandalus montagui) in the eastern Hudson Strait and Ungava Bay. CAFSAC Res. Doc. 81/6. 22 p.

P3 Parsons, D. G., G. E. Tucker, and P. J. Veitch. 1981. Review of abundance indices and stock assessment for shrimp (Pandalus borealis) in the Labrador channels. CAFSAC Res. Doc. 81/7. 41 p.

P3 Parsons, D. G., P. J. Veitch, and G. E. Tucker. 1981. Data on the shrimp (Pandalus borealis) fishery in Division 0A in 1981. NAFO SCR Doc. 81/146, Ser. No. N455. 20 p.

E3 Payne, J. F., and L. L. Fancey. 1981. Mixed function oxidase enzyme induction as a biological monitor and indicator in aquatic toxicology: further studies. ICES C.M.1981/E:57. 16 p.

E2 Payne, J. F., and A. Rahimtula. 1981. Water chlorination as a source of aquatic environmental mutagens, p. 209-221. In M.A.Q. Khan and R. H. Stanton [ed.] Toxicology of halogenated hydrocarbons: health and ecological effects. Pergamon Press, New York.

E3 Penney, R. W., and J. T. Anderson. 1981. Otolith analysis of age and growth of larval redfish (Sebastes sp.) on Flemish Cap, 1979 and 1980. NAFO SCR Doc. 81/117, Ser. No. N423. 15 p.

F3 Pippy, J.H.C. 1981. Canada, p. 1-10. In Administrative Report of the Anadromous and Catadromous Fish Committee. ICES C.M.1981/M:1.

G3 Pitt, T. K., and W. B. Brodie. 1981. A stock assessment update of American plaice in NAFO Divisions 3L, 3N and 3O. NAFO SCR Doc. 81/61, Ser. No. N345. 14 p.

G3 Pitt, T. K., and W. B. Brodie. 1981. Stock assessment of American plaice in NAFO Subarea 2 - Division 3K. CAFSAC Res. Doc. 81/51. 17 p.

G2 Pitt, T. K., R. Wells, and W. D. McKone. 1981. A critique of research vessel otter trawl surveys by the St. John's Research and Resource Services, p. 42-61. In W. G. Doubleday and D. Rivard [ed.] Bottom trawl surveys. Can. Spec. Publ. Fish. Aquat. Sci. 58.

E1 Rahimtula, A. D., J. F. Payne, and I. Martins. 1981. Hydrocarbon-based oils as inducers of cutaneous aryl hydrocarbon hydroxylase. Toxicol. Lett. 10: 213-217.

F3 Reddin, D. G. 1981. Stock identification, p. 33-42. In Report of the 27th Meeting of the Baltic Salmon Working Group. ICES C.M.1981/M:2.

F3 Reddin, D. G. 1981. Conversion of weights of Atlantic salmon with viscera removed and heads-on to round weight at West Greenland. ICES C.M.1981/M:20. 7 p. [also CAFSAC Res. Doc. 81/30].

F3 Reddin, D. G. 1981. Estimation of fishing mortality for Atlantic salmon (Salmo salar) in Newfoundland and Labrador commercial fisheries. ICES C.M.1981/M:24. 11 p.

F3 Reddin, D. G., and R. F. Burfitt. 1981. Proportion of North American and European Atlantic salmon off West Greenland in 1980. ICES C.M.1981/M:21. 12 p. [also CAFSAC Res. Doc. 81/28].

F3 Reddin, D. G., and R. F. Burfitt. 1981. Length, weight, sex and age characteristics of Atlantic salmon (Salmo salar) of North American and European origin caught at West Greenland in 1979. ICES C.M.1981/M:22. 23 p. [also CAFSAC Res. Doc. 81/29].

F3 Reddin, D. G., and R. F. Burfitt. 1981. Salmon stock identification at West Greenland and hatchery components. ICES C.M.1981/M:23. 6 p.

FP3 Reddin, D. G., and J. E. Carscadden. 1981. Salmon-capelin interactions. CAFSAC Res. Doc. 81/2. 38 p.

FE3 Reddin, D. G., and R. K. Misra. 1981. Separation of North River, Cape Breton Island Atlantic salmon (Salmo salar L.) stocks in a mixed stock fishery using multivariate analysis techniques. CAFSAC Res. Doc. 81/33. 9 p.

F3 Reddin, D. G., and P. B. Short. 1981. The 1976 Newfoundland and Labrador Atlantic salmon commercial landings. Can. Tech. Rep. Fish. Aquat. Sci. 1007: iv + 105 p.

G1 Roff, D. A. 1981. Reproductive uncertainty and the evolution of iteroparity: why don't flatfish put all their eggs in one basket? Can. J. Fish. Aquat. Sci. 38: 968-977.

GP3 Roff, D. A., and W. D. Bowen. 1981. Population dynamics of harp seals, 1967-1991. NAFO SCR Doc. 81/166, Ser. No. N474. 40 p.

F3 Ryan, P. M., L. J. Cole, D. P. Riche, and D. Wakeham. 1981. Age and growth of salmonids in the Experimental Ponds Area, central Newfoundland, 1977-80. Can. Data Rep. Fish. Aquat. Sci. 304: iv + 284 p.

F1 Ryan, P. M., and H. H. Harvey. 1981. Factors accounting for variation in the growth of rock bass (Ambloplites rupestris) and yellow perch (Perca flavescens) in the acidifying La Cloche Mountain Lakes of Ontario, Canada. Verh. Int. Verein. Limnol. 21: 1231-1237.

G3 Sandeman, E. J. 1981. The fish and shellfish resources of the offshore area, 35 p. In Proc. Offshore Environment in the 80's, St. John's, Nfld., December 2-4, 1980.

03 Sandeman, E. J., J. S. Scott, and J. Boulva. 1981. Canadian research report for 1980. NAFO SCS Doc. 81/23, Ser. No. N384. 19 p.

E1 Sanclair, I. R., A. C. Dey, and S. Rahal. 1981. C-21 and 6-hydroxylation of progesterone by detergent solubilised hepatic microsomal fractions. J. Steroid Biochem. 14: 281-284.

04 *ShawMont Newfoundland Ltd. 1981. Report on the collection and assembly of all available surface water quality data for Newfoundland and Labrador. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 60 p.

F3 Short, P. B., and D. G. Reddin. 1981. Newfoundland and Labrador Atlantic salmon commercial catch data - 1977. Can. Data Rep. Fish. Aquat. Sci. 282: iv + 103 p.

F3 Short, P. B., and D. G. Reddin. 1981. Newfoundland and Labrador Atlantic salmon commercial catch data - 1978. Can. Data Rep. Fish. Aquat. Sci. 283: iv + 114 p.

G2 Smith, S. J. 1981. A comparison of estimators of location for skewed populations, with applications to groundfish trawl surveys, p. 154-163. In W. G. Doubleday and D. Rivard [ed.] Bottom trawl surveys. Can. Spec. Publ. Fish. Aquat. Sci. 58.

GP3 Smith, S. J., and K. S. Naidu. 1981. A comparison of four estimators of the variance of the mean from a two dimensional systematic sample. CAFSAC Res. Doc. 81/74. 21 p.

GE3 Smith, S. J., and G. D. Somerton. 1981. STRAP: a user-oriented computer analysis system for groundfish research trawl survey data. Can. Tech. Rep. Fish. Aquat. Sci. 1030: iv + 66 p.

G3 Stevenson, S. C. 1981. Summary of discarding and estimates of total removals by Canadian trawlers during the 1980 Divisions 3LNO American plaice fishery. NAFO SCR Doc. 81/55, Ser. No. N339. 8 p.

E1 Stewart, P., A. K. Bal, G. Fletcher, and J. F. Payne. 1981. Ultrastructural studies on a necrotic skin lesion in winter flounder. Microscop. Soc. Can. 8: 70-71.

P3 Taylor, D. M., and P. G. O'Keefe. 1981. Assessment of snow crab (Chionoecetes opilio) stocks in Newfoundland, 1979. CAFSAC Res. Doc. 81/57. 34 p.

01 *Templeman, W. 1981. Vertebral numbers of Atlantic cod, Gadus morhua, of the Newfoundland and adjacent areas, 1947-71, and their use for delineating cod stocks. J. Northw. Atl. Fish. Sci. 2: 21-45.

03 *Templeman, W. 1981. Biology of the thorny skate in relation to sex and sexual maturity. Report submitted to Department of Fisheries and Oceans (Newfoundland Region).

G3 Walsh, S. J., and W. R. Bowering. 1981. Histological and visual observations on oogenesis and sexual maturity in Greenland halibut off northern Labrador. NAFO Sci. Coun. Studies 1: 71-75 [also NAFO SCR Doc. 80/82, Ser. No. 1361.

G3 Wells, R. 1981. Age determination of cod from otoliths collected in Divisions 2J, 3K and 3L. NAFO Sci. Coun. Studies 1: 77-101 [also NAFO SCR Doc. 80/156, Ser. No. 2321.

G3 Wells, R. 1981. Effects of changes in mesh size upon yield per recruit of cod in Division 3M. NAFO SCR Doc. 81/2, Ser. No. N265. 5 p.

G3 Wells, R. 1981. Distribution and abundance of cod on the Flemish Cap in January 1981 and mortality in 1980. NAFO SCR Doc. 81/13, Ser. No. N277. 7 p.

G3 Wells, R. 1981. The number of research vessel tows on the Flemish Cap is never enough. NAFO SCR Doc. 81/15, Ser. No. N279. 3 p.

G3 Wells, R. 1981. Status in 1980 of the cod stock in Divisions 2J3KL. NAFO SCR Doc. 81/66, Ser. No. N350. 13 p.

P3 Wheeler, J. P., and G. H. Winters. 1981. An assessment of the east coast Newfoundland herring stocks. CAFSAC Res. Doc. 81/42. 60 p.

03 *Whitehead, H., R. Silver, and P. Harcourt. 1981. The humpback whale at Bay de Verde. Final report submitted to Department of Fisheries and Oceans (Newfoundland Region). 63 p.

P1 Winters, G. H. 1981. Growth patterns in sand lance, Ammodytes dubius, from the Grand Bank. Can. J. Fish. Aquat. Sci. 38: 841-846.

P3 Worthy, G.A.J., D. M. Lavigne, and W. D. Bowen. 1981. Post-weaning growth of the harp seal, Phoca groenlandica. NAFO SCR Doc. 81/163, Ser. No. N471. 37 p.

PUBLICATIONS - 1982

E3 Akenhead, S. 1982. Fisheries yield response to an offshore oil spill, p. 463-475. In Proc. Fifth Arctic Marine Oilspill Program Technical Seminar, Edmonton, Alta., June 15-17, 1982.

E3 Akenhead, S. A. 1982. Flemish Cap cod year-class strength and environmental variables. NAFO SCR Doc. 82/41, Ser. No. N530. 10 p.

EPG2 Akenhead, S. A., J. Carscadden, H. Lear, G. R. Lilly, and R. Wells. 1982. Cod-capelin interactions off northeast Newfoundland and Labrador, p. 141-148. In M. C. Mercer [ed.] Multispecies approaches to fisheries management advice. Can. Spec. Publ. Fish. Aquat. Sci. 59.

E3 Anderson, J. T. 1982. Prospectus on future research for the Flemish Cap Project. NAFO SCR Doc. 82/2, Ser. No. N483. 14 p.

E3 Anderson, J. T. 1982. Distribution, abundance and growth of cod (Gadus morhua) and redfish (Sebastes spp.) larvae on Flemish Cap, 1981. NAFO SCR Doc. 82/37, Ser. No. N526. 11 p.

E3 Anderson, J. T. 1982. Size and condition of larval Sebastes spp. on Flemish Cap during spring 1980. NAFO SCR Doc. 82/38, Ser. No. N527. 12 p.

E4 Anderson, J. T., and R. W. Penney. 1982. Physical structure of surface waters controlling growth and condition in fish larvae on Flemish Cap [Abstract]. EOS 63(45): 942.

O4 Anon. 1982. [Edited by L. W. Coady] Program Review and Evaluation (PRE) - 1981. Research and Resource Services, Department of Fisheries and Oceans, St. John's, Newfoundland. 269 p.

O4 Anon. 1982. Organization and Management of Fisheries Research Branch. Department of Fisheries and Oceans, St. John's, Newfoundland. 73 p.

E1 Appy, R. G., and D. K. Cone. 1982. Attachment of Myzobdella lugubris (Hirudinea: Piscicolidae) to logperch, Percina caprodes, and brown bullhead, Ictalurus nebulosus. Trans. Am. Microsc. Soc. 101: 135-141.

G3 Atkinson, D. B. 1982. Status of roundnose grenadier stocks in Subareas 0+1 and 2+3. NAFO SCR Doc. 82/35, Ser. No. N548. 9 p.

G3 Atkinson, D. B. 1982. Analysis of data on redfish in Divisions 3LN. NAFO SCR Doc. 82/39, Ser. No. N552. 25 p.

G3 Atkinson, D. B. 1982. The use of hydroacoustics for the enumeration of redfish - preliminary investigations in NAFO Divisions 4RS. NAFO SCR Doc. 82/105, Ser. No. N614. 7 p.

GP3 Atkinson, D. B., W. R. Bowering, D. G. Parsons, Sv. Aa. Horsted, and J. P. Minet. 1982. A review of the biology and fisheries for roundnose grenadier, Greenland halibut and northern shrimp in Davis Strait. NAFO Sci. Coun. Studies 3: 7-27 [also NAFO SCR Doc. 81/22, Ser. No. N2901.

G3 Atkinson, D. B., and C. A. Gavaris. 1982. 3P redfish. CAFSAC Res. Doc. 82/35. 43 p.

E1 Banoub, J. H. 1982. Identification of the methylation products of 3-acetamido-3,6-dideoxy-L-glucose by g.l.c.-m.s. Carbohydr. Res. 100: C17-C23.

E1 Banoub, J. H., and F. Michon. 1982. A rapid, g.l.c.-m.s. method for identification of the N-acetyl group of amino sugars in complex carbohydrates. Carbohydr. Res. 100: C24-C26.

E1 Banoub, J. H., and F. Michon. 1982. Chromium trioxide oxidation of acetylated 3-amino-3,6-dideoxy-L-hexosides. Can. J. Biochem. 60: 517-520.

P3 Beck, P. C., E. G. Dawe, and J. Drew. 1982. Breakdown of short-finned squid catches in NAFO Subarea 3 and Division 4R for 1980 and biological characteristics for Newfoundland inshore commercial samples and early season offshore samples. NAFO SCR Doc. 82/27, Ser. No. N515. 16 p.

G3 Bishop, C. A. 1982. Cod trap mesh selection studies. Can. Tech. Rep. Fish. Aquat. Sci. 1075: iv + 47 p.

G3 Bishop, C. A., and S. Gavaris. 1982. Assessment of cod stock in Divisions 3NO. NAFO SCR Doc. 82/57, Ser. No. N550. 11 p.

G3 Bishop, C. A., and S. Gavaris. 1982. Assessment of the cod stock in NAFO Divisions 2J3KL. NAFO SCR Doc. 82/68, Ser. No. N561. 12 p.

G3 Bishop, C. A., and S. Gavaris. 1982. Further considerations in assessment of the cod stock in Div. 2J+3KL. NAFO SCR Doc. 82/111, Ser. No. N633. 24 p.

G3 Bishop, C. A., and S. Gavaris. 1982. Status of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 82/33. 26 p.

E3 Bobbitt, J., and S. Akenhead. 1982. Influence of controlled discharge from the Churchill River on the oceanography of Groswater Bay, Labrador. Can. Tech. Rep. Fish. Aquat. Sci. 1097: iv + 43 p.

P2 Bowen, W. D. 1982. The harp seal, p. 209-213. In D. Pursley and G. Deems [ed.] North American furbearers, a contemporary reference. Assoc. Fish. Wildl. Agencies, Univ. Press, College Park, Maryland.

P2 Bowen, W. D. 1982. The hooded seal, p. 215-217. In D. Pursley and G. Deems [ed.] North American furbearers, a contemporary reference. Assoc. FIsh. Wildl. Agencies, Univ. Press, College Park, Maryland.

P3 Bowen, W. D. 1982. Age structure of Northwest Atlantic harp seal catches, 1952-80. NAFO Sci. Coun. Studies 3: 53-65 [also NAFO SCR Doc. 80/168, Ser. No. N255].

P1 Bowen, W. D. 1982. Home range and spatial organization of coyotes in Jasper National Park, Alberta. J. Wildl. Manage. 46: 201-216 [non-aquatic publication prepared by researcher while on staff].

P1 Bowen, W. D. 1982. Determining age of coyotes, Canis latrans, by tooth sections and tooth-wear patterns. Can. Field-Nat. 96: 339-341 [non-aquatic publication prepared by researcher while on staff].

P4 Bowen, W. D. 1982. The harp seal. Underwater World 82/011. 8 p.

G1 Bowering, W. R. 1982. Population dynamics of Greenland halibut in the Gulf of St. Lawrence. J. Northw. Atl. Fish. Sci. 3: 141-147.

G3 Bowering, W. R. 1982. Stock identification studies of Greenland halibut (Reinhardtius hippoglossoides) in the Northwest Atlantic from tagging experiments. NAFO SCR Doc. 82/78, Ser. No. N584. 18 p.

G3 Bowering, W. R. 1982. Minimum trawlable biomass estimates of Greenland halibut in NAFO Divisions 2G and 2H from post-stratified groundfish surveys. NAFO SCR Doc. 82/100, Ser. No. N609. 8 p.

G3 Bowering, W. R. 1982. An examination of the witch by-catch fishery in NAFO Divisions 2J and 3KL. CAFSAC Res. Doc. 82/28. 22 p.

G4 Bowering, W. R. 1982. Witch flounder. Underwater World 82/12. 6 p.

G3 Bowering, W. R., and W. B. Brodie. 1982. The Greenland halibut fishery in NAFO Subarea 2 and Divisions 3KL. NAFO SCR Doc. 82/67, Ser. No. N560. 13 p.

GP3 Bowering, W. R., G. R. Lilly, and D. G. Parsons. 1982. Predators of shrimp (Pandalus borealis) in the Cartwright (Div. 2J) and Hopedale (Div. 2H) Channels. CAFSAC Res. Doc. 82/9. 32 p.

GE1 Bowering, W. R., and R. K. Misra. 1982. Comparisons of witch flounder (Glyptocephalus cynoglossus) stocks of the Newfoundland-Labrador area, based upon a new multivariate analysis method for meristic characters. Can. J. Fish. Aquat. Sci. 39: 564-570.

G3 Brodie, W. B., and T. K. Pitt. 1982. American plaice in NAFO Divisions 3L, 3N and 3O - a stock assessment update. NAFO SCR Doc. 82/52, Ser. No. N545. 13 p.

G3 Brodie, W. B., and T. K. Pitt. 1982. Assessment update for the yellowtail stocks in Divisions 3LNO. NAFO SCR Doc. 82/53, Ser. No. N546. 14 p.

G3 Brodie, W. B., and T. K. Pitt. 1982. Stock assessment update of American plaice in NAFO Subarea 2 - Division 3K. CAFSAC Res. Doc. 82/32. 18 p.

F3 Bruce, W. J. 1982. American eel, Anguilla rostrata - Newfoundland Region, p. 36-38. In Proceedings of the 1980 North American Eel Conference. Ont. Fish. Tech. Rep. Ser. No. 4.

03 *Buchanan, R. A., D. H. Thomson, and G. J. Chaput. 1982. Seasonal abundance, feeding ecology and biology of Atlantic cod (Gadus morhua) in the Packs Harbour and Domino Region of the Labrador coast during the summer and early fall, 1981. Report submitted by LGL Limited to Department of Fisheries and Oceans (Newfoundland Region). 135 p.

P3 Carscadden, J. E., and D. S. Miller. 1982. An assessment of the capelin stock in Subarea 2 and Division 3K using a sequential capelin abundance model. NAFO SCR Doc. 82/56, Ser. No. N549. 13 p.

PF3 Carscadden, J. E., and D. G. Reddin. 1982. Salmon-capelin interactions. Here today gone tomorrow. CAFSAC Res. Doc. 82/23. 10 p.

F1 Chadwick, E.M.P. 1982. Stock-recruitment relationship for Atlantic salmon (Salmo salar) in Newfoundland rivers. Can. J. Fish. Aquat. Sci. 39: 1496-1501.

F3 Chadwick, E.M.P. 1982. 1SW Atlantic salmon harvests predicted one year in advance. ICES C.M.1982/M:20. 10 p.

F3 Chadwick, E.M.P. 1982. Recreational catch as an index of Atlantic salmon spawning escapement. ICES C.M.1982/M:43. 5 p.

F3 Chadwick, E.M.P. 1982. Dynamics of an Atlantic salmon stock (Salmo salar) in a small Newfoundland river. Ph.D. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 267 p.

P3 Cleary, L., J. J. Hunt, J. Moores, and D. Tremblay. 1982. Herring Ageing Workshop, St. John's, Newfoundland, March - 1982. CAFSAC Res. Doc. 82/41. 10 p.

03 Coady, L. W., J. S. Scott, and H. Powles. 1982. Canadian research report, 1981. NAFO SCS Doc. 82/8, Ser. No. N490. 21 p.

E1 Cone, D. K. 1982. A Lactobacillus sp. from diseased female rainbow trout, Salmo gairdneri Richardson, in Newfoundland, Canada. J. Fish Dis. 5: 479-485.

E1 Cone, D. K., and M.D.B. Burt. 1982. The behaviour of Urocleidus adspectus Mueller, 1936 (Monogenea) on the gills of Perca flavescens. Can. J. Zool. 60: 3237-3240.

E1 Cone, D. K., and M.D.B. Burt. 1982. The host specificity of Urocleidus adspectus Mueller, 1936 (Monogenea: Ancyrocephalinae). J. Parasitol. 68: 1168-1170.

P3 Dawe, E. G., and P. C. Beck. 1982. Rhynchoteuthion larvae from the Northwest Atlantic and aspects of the distribution of larval Illex. NAFO SCR Doc. 82/26, Ser. No. N514. 13 p.

P3 Dawe, E. G., Yu. M. Froerman, E. N. Shevchenko, V. V. Khalyukov, and V. A. Bolotov. 1982. Distribution and size composition of juvenile short-finned squid (Illex illecebrosus) in the Northwest Atlantic in relation to mechanisms of transport, February 4-April 30, 1982. NAFO SCR Doc. 82/25, Ser. No. N513. 41 p.

P03 Dawe, E. G., M. C. Mercer, and W. Threlfall. 1982. On the stock identity of short-finned squid (Illex illecebrosus) in the Northwest Atlantic. NAFO SCR Doc. 82/91, Ser. No. N600. 16 p.

F3 Dempson, J. B. 1982. Stock assessment of Tikkoatokak Bay Arctic charr. CAFSAC Res. Doc. 82/5. 19 p.

F3 Dempson, J. B. 1982. Summary of catch statistics and change in size characteristics of northern Labrador Arctic charr populations. CAFSAC Res. Doc. 82/7. 17 p.

F3 Dempson, J. B. 1982. Rationale for establishing a TAC in Hebron Fiord during 1982. CAFSAC Res Doc. 82/38. 12 p.

F3 Dempson, J. B. 1982. Ecology and comparative population dynamics of anadromous Arctic charr, Salvelinus alpinus (Linnaeus 1758), in northern Labrador. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 190 p.

F3 Dempson, J. B., and L. LeDrew. 1982. An assessment of Arctic charr stocks in Volsey Bay, Anaktalik Bay and Okak Bay, northern Labrador. CAFSAC Res. Doc. 82/6. 18 p.

E1 Dey, A. C. 1982. Comparison of the properties of phosphoglucomutase from muscle of turbot (Reinhardtius hippoglossoides, Greenland halibut) and witch flounder (Glyptocephalus cynoglossus) from the Northwest Atlantic and the Gulf of St. Lawrence. Comp. Biochem. Physiol. 72B: 249-254.

E4 Dey, A. C., J. W. Kiceniuk, and U. Williams. 1982. Studies on liver lipids of cod following long-term exposure to crude petroleum [Abstract]. Am. Soc. Environ. Toxicol. Chem., Virginia, U.S.A., 1982, p. 123.

O4 *Dobrocky Seatech (Nfld.) Ltd. 1982. Identification and enumeration of nannoplankton samples from the Newfoundland Experimental Ponds Area. Report submitted to Department of Fisheries and Oceans (Newfoundland Region).

P3 Ennis, G. P. 1982. The Newfoundland lobster fishery: a review of statistics, stock status and current management considerations. Can. MS Rep. Fish. Aquat. Sci. 1666: iv + 11 p.

P3 Ennis, G. P., P. W. Collins, and G. Dawe. 1982. Fisheries and population biology of lobsters (Homarus americanus) at Comfort Cove, Newfoundland. Can. Tech. Rep. Fish. Aquat. Sci. 1116: iv + 45 p.

E1 Evans, G. T. 1982. Linearizing ecological models with time-varying parameters. Math. Biosci. 61: 155-161.

G3 Gavaris, C. A. 1982. An assessment of redfish on the Flemish Cap. NAFO SCR Doc. 82/58, Ser. No. N551. 9 p.

G3 Gavaris, C. A. 1982. Update of Division 3O redfish assessment. CAFSAC Res. Doc. 82/26. 8 p.

G3 Gavaris, C. A., and D. B. Atkinson. 1982. Assessment of redfish in Divisions 4RST. CAFSAC Res. Doc. 82/30. 24 p.

G3 Gavaris, C. A., and D. B. Atkinson. 1982. An assessment of redfish in Subarea 2 + Division 3K. CAFSAC Res. Doc. 82/31. 18 p.

G3 Gavaris, S. 1982. Status of the cod stock in NAFO Division 3M. NAFO SCR Doc. 82/66, Ser. No. N559. 3 p.

G3 Gavaris, S., and C. A. Bishop. 1982. Assessment of the cod stock in 3Pn4RS. CAFSAC Res. Doc. 82/27. 19 p.

F4 Gibson, R. J. 1982. Brown trout in St. John's. The Osprey 13: 72-76.

F1 Gibson, R. J., and Y. Côté. 1982. Production de saumonneaux et recaptures de saumons adultes étiquetés à la rivière Matamec, Côte-Nord, Golfe du Saint-Laurent, Québec. Nat. Can. (Que.) 109: 13-25.

G3 Halliday, R. G., and A. T. Pinhorn. 1982. The groundfish resource in the Gulf of St. Lawrence. Can. Tech. Rep. Fish. Aquat. Sci. 1086: iv + 16 p.

P3 Hay, K. 1982. Aerial line-transect estimates of abundance of humpback, fin, and long-finned pilot whales in the Newfoundland-Labrador area. Rep. Int. Whaling Comm. 32: 475-486.

P3 Hay, K., and D. McKinnon. 1982. Abundance estimates for humpback whales and fin whales in the eastern Newfoundland and southeastern Labrador areas, August 1981. CAFSAC Res. Doc. 82/46. 17 p.

O3 *Kendaris, T. A. 1982. An acid rain inventory survey of selected Labrador lakes. Report submitted by Dobrocky Seatech (Nfld.) Ltd. to Department of Fisheries and Oceans (Newfoundland Region). 126 p.

O3 *Kendaris, T. A. 1982. Acid rain: a survey of selected headwater lakes in Newfoundland. Report submitted by Dobrocky Seatech (Nfld.) Ltd. to Department of Fisheries and Oceans (Newfoundland Region). 118 p.

O4 *Khan, R. A. 1982. Histopathological effects of crude oils on Atlantic cod following chronic exposure: a report. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 5 p.

GE1 Khan, R. A., M. Dawe, R. Bowering, and R. K. Misra. 1982. Blood protozoa as an aid for separating stocks of Greenland halibut, Reinhardtius hippoglossoides, in the northwestern Atlantic. Can. J. Fish. Aquat. Sci. 39: 1317-1322.

E1 Kiceniuk, J. W., R. A. Khan, M. Dawe, and U. Williams. 1982. Examination of interaction of trypanosome infection and crude oil exposure on hematology of the longhorn sculpin (Myoxocephalus octodecemspinosus). Bull. Environ. Contam. Toxicol. 28: 435-438.

G4 Kulka, D. W. 1982. The effect of large mesh in the codend on catch rates and size of fish - a preliminary analysis in the 2J+3KL cod fishery. Report to Industry. 14 p.

G3 Kulka, D. W. 1982. Estimates of discarding by Newfoundland offshore vessels in 1981. CAFSAC Res. Doc. 82/34. 22 p.

G1 Kulka, D. W., and S. Corey. 1982. Length and weight relationships of euphausiids and caloric values of Meganyctiphanes norvegica (M. Sars) in the Bay of Fundy. J. Crustacean Biol. 2: 239-247.

G1 Kulka, D. W., S. Corey, and T. D. Iles. 1982. Community structure and biomass of euphausiids in the Bay of Fundy. Can. J. Fish. Aquat. Sci. 39: 326-334.

G3 Lear, W. H. 1982. Discrimination of the cod stock complex in Divisions 2J+3KL based on tagging. NAFO SCR Doc. 82/89, Ser. No. N598. 33 p.

G3 Lear, W. H., and R. Wells. 1982. Vertebral averages of juvenile cod (Gadus morhua) from eastern Newfoundland and Labrador as indicators of stock origin. NAFO SCR Doc. 82/75, Ser. No. N581. 28 p.

F3 LeDrew, L. J., and J. B. Dempson. 1982. Summary of catch statistics from the northern Labrador commercial Arctic charr (Salvelinus alpinus) fishery. Can. Data Rep. Fish. Aquat. Sci. 353: iv + 52 p.

O3 *Lien, J., D. Jinhai, L. Baraff, J. Harvey, and K. Chu. 1982. Whale entrapments in inshore fishing gear during 1982. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 36 p.

G3 Lilly, G. R. 1982. Influence of the Labrador Current on predation by cod on capelin and sand lance off eastern Newfoundland. NAFO Sci. Coun. Studies 3: 77-82 [also NAFO SCR Doc. 81/7, Ser. No. N271].

G3 Lilly, G. R. 1982. The marine invertebrates code of the Northwest Atlantic Fisheries Centre. Can. Data Rep. Fish. Aquat. Sci. 365: iv + 44 p.

G3 Lilly, G. R. 1982. Cannibalism in Atlantic cod (Gadus morhua L.) on Flemish Cap in winter, 1978-82. NAFO SCR Doc. 82/36, Ser. No. N525. 5 p.

G1 Lilly, G. R., and C. A. Gavaris. 1982. Distribution and year-class strength of juvenile redfish, Sebastes sp., on Flemish Cap in the winters of 1978-82. J. Northw. Atl. Fish. Sci. 3: 115-222.

G3 Lilly, G. R., and C. A. Gavaris. 1982. Distribution and abundance of juvenile redfish (Sebastes sp.) on Flemish Cap in winter 1982: evidence of strong recruitment. NAFO SCR Doc. 82/35, Ser. No. N524. 11 p.

E2 Lüderitz, O., M. A. Freudenberg, C. Galanos, V. Lehmann, E. Th. Rietschel, and D. H. Shaw. 1982. Lipopolysaccharides of gram-negative bacteria, p. 79-151. In S. Razin and S. Rottem [ed.] Microbial membrane lipids. Current topics in membranes and transport 17. Academic Press.

O4 *MacLaren Plansearch Ltd. 1982. Identification of lake benthos from the acid- rain head-water lake survey. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 24 p.

O2 Mercer, M. C. 1982. Multispecies approaches to fisheries management advice: workshop report, p. 1-15. In M. C. Mercer [ed.] Multispecies approaches to fisheries management advice. Can. Spec. Publ. Fish. Aquat. Sci. 59.

O2 Mercer, M. C. [ed.]. 1982. Multispecies approaches to fisheries management advice. Can. Spec. Publ. Fish. Aquat. Sci. 59: 169 p.

P3 Miller, D. S., B. S. Nakashima, and J. E. Carscadden. 1982. Capelin acoustic surveys in NAFO Divisions 2J+3K, 3LNO, and 3L, 1981-82. NAFO SCR Doc. 82/54, Ser. No. N547. 12 p.

EG3 Misra, R. K., and I-H. Ni. 1982. Introducing a new discriminant analysis (with covariance) and multivariate analysis of covariance, with a study of beaked redfishes Sebastes mentella and S. fasciatus. NAFO SCR Doc. 82/112, Ser. No. N516. 10 p.

E4 Misra, R. K., and S. J. Smith. 1982. Comment on "Multivariate analysis as a means of comparing growth in fish". Can. J. Fish. Aquat. Sci. 39: 1430.

PG3 Moores, J. A., and G. R. Lilly. 1982. Distribution of herring in the northern Gulf of St. Lawrence in winter. CAFSAC Res. Doc. 82/14. 22 p.

P1 Moores, J. A., and G. H. Winters. 1982. Growth patterns in a Newfoundland Atlantic herring (Clupea harengus harengus) stock. Can. J. Fish. Aquat. Sci. 39: 454-461.

P3 Moores, J. A., G. H. Winters, and M. F. Dawson. 1982. An examination of the status of the west coast herring stock with a re-evaluation of the historical data base. CAFSAC Res. Doc. 82/49. 47 p.

P3 Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1982. Status and assessment of the Iceland scallop, Chlamys islandica, in the northeastern Gulf of St. Lawrence. CAFSAC Res. Doc. 82/2. 66 p.

P3 Naidu, K. S., and S. J. Smith. 1982. A two-dimensional systematic survey of the Iceland scallop, Chlamys islandica, in the Strait of Belle Isle. CAFSAC Res. Doc. 82/4. 24 p.

PG3 Nakashima, B. S., J. E. Carscadden, and G. R. Lilly. 1982. Capelin (Mallotus villosus) biology and history of the fishery in the northern Gulf of St. Lawrence, Div. 4RS. CAFSAC Res. Doc. 82/29. 32 p.

P3 Nakashima, B. S., and R. W. Harnum. 1982. Summary of a logbook survey of the 1981 inshore capelin fishery in Divisions 3KL. NAFO SCR Doc. 82/18, Ser. No. N506. 6 p.

P4 Nakashima, B. S., and W. C. Leggett. 1982. Reply to comment on the role of fishes in the regulation of phosphorus availability in lakes. How important is phosphorus excretion by fish to the phosphorus dynamics of lakes? Can. J. Fish. Aquat. Sci. 39: 364-366.

G1 Ni, I-H. 1982. Meristic variation in beaked redfishes, Sebastes mentella and S. fasciatus, in the Northwest Atlantic. Can. J. Fish. Aquat. Sci. 39: 1684-1685.

G3 Ni, I-H. 1982. Meristic variation in golden redfish, Sebastes marinus, in the Northwest Atlantic. NAFO SCR Doc. 82/82, Ser. No. N590. 10 p.

G3 Ni, I-H. 1982. Meristic variation in beaked redfishes, Sebastes mentella and S. fasciatus, in the Northwest Atlantic. NAFO SCR Doc. 82/83, Ser. No. N591. 30 p.

G3 Ni, I-H., and E. J. Sandeman. 1982. The logistic model for determining size at maturity in species differentiation and stock discrimination for Northwest Atlantic redfishes. NAFO SCR Doc. 82/88, Ser. No. N597. 13 p.

G3 Ni, I-H., and W. Templeman. 1982. Reproductive cycles of redfishes in southern Newfoundland waters. NAFO SCR Doc. 82/87, Ser. No. N596. 12 p.

O3 *Northland Associates Ltd. 1982. Preparation of an ecodistrict map of the Island of Newfoundland. Prepared for Department of Fisheries and Oceans (Newfoundland Region). 95 p.

P3 Parsons, D. G. 1982. Biological characteristics of northern shrimp (Pandalus borealis Krøyer) in areas off Labrador. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 123 p.

P3 Parsons, D. G., G. E. Tucker, and P. J. Veitch. 1982. An update of the assessment of shrimp (Pandalus borealis) stocks off Labrador. CAFSAC Res. Doc. 82/10. 36 p.

E4 Payne, J. F. 1982. Critique of "Petroleum and marine fishes: a review of uptake disposition and effects". Environ. Sci. Technol. 16: 370-372.

E1 Payne, J. F. 1982. Metabolism of complex mixtures of oil spill surfactant compounds by a representative teleost (Salmo gairdneri), crustacean (Cancer irroratus), and mollusc (Chlamys islandicus). Bull. Environ. Contam. Toxicol. 28: 277-280.

E4 Payne, J. F. 1982. What would oil spills do to our fishery? Union Forum 6(2): 14-15.

E1 Payne, J. F., and L. L. Fancey. 1982. Effect of long-term exposure to petroleum on mixed function oxygenases in fish: further support for use of the enzyme system in biological monitoring. Chemosphere 11: 207-213.

E3 Payne, J. F., R. Maloney, A. Rahimtula, and I. Martins. 1982. Petroleum and petroleum combustion byproducts as potential sources of marine environmental mutagens, p. 102-109. In N. L. Richards and B. L. Jackson [ed.] Proc. Symp. Carcinogenic Polynuclear Aromatic Hydrocarbons in the Marine Environment, Pensacola Beach, Florida, August 14-18, 1978.

G1 Payne, R. H., and I-H. Ni. 1982. Biochemical population genetics of redfishes (Sebastes) off Newfoundland. J. Northw. Atl. Fish. Sci. 3: 169-172.

G3 Payne, R. H., and I-H. Ni. 1982. The biochemical population genetics of redfishes (Sebastes) off southern Newfoundland. NAFO SCR Doc. 82/109, Ser. No. N518. 5 p.

E3 Penney, R. W. 1982. Identity of the larval redfish (Sebastes spp.) population on Flemish Cap: preliminary report. NAFO SCR Doc. 82/39, Ser. No. N528. 14 p.

E3 Penney, R. W. 1982. Otolith analysis of age and growth of larval redfish (Sebastes spp.) on Flemish Cap, 1981. NAFO SCR Doc. 82/40, Ser. No. N529. 8 p.

G3 Pinhorn, A. T. 1982. Has the catchability coefficient (q) really changed in Div. 2J+3KL cod fishery? NAFO SCR Doc. 82/99, Ser. No. N608. 6 p.

F3 Pippy, J. 1982. (Chairman). Report of the Working Group on the Interception of Mainland Salmon in Newfoundland. Can. MS Rep. Fish. Aquat. Sci. 1654: x + 196 p.

F3 Pippy, J.H.C. 1982. Canada, p. 1-8. In Administrative Report of the Anadromous and Catadromous Fish Committee. ICES C.M.1982/M:1.

F3 Pippy, J.H.C., and D. G. Reddin. 1982. Report on the 1981/82 International Atlantic Salmon Scale Reading Exercise. ICES C.M.1982/M:14. 23 p.

G3 Pitt, T. K. 1982. Recalculation of natural mortality of American plaice from the Grand Bank. NAFO SCR Doc. 82/48, Ser. No. N537. 5 p.

G4 Pitt, T. K. 1982. American plaice. Underwater World, DFO/122, 1982/5E.

G3 Pitt, T. K., and W. B. Brodie. 1982. American plaice, Subdivision 3Ps data update for stock assessments. CAFSAC Res. Doc. 82/42. 7 p.

G1 Power, D. J., and I-H. Ni. 1982. Morphology of the extrinsic gasbladder musculature in the golden redfish, Sebastes marinus. J. Northw. Atl. Fish. Sci. 3: 165-168.

G3 Power, D. J., and I-H. Ni. 1982. Morphology of the extrinsic gasbladder musculature in the golden redfish, Sebastes marinus. NAFO SCR Doc. 82/110, Ser. No. N619. 7 p.

E1 Rahimtula, A. D., J. F. Payne, and I. Martins. 1982. Hydrocarbon-based oils as inducers of cutaneous aryl hydrocarbon hydroxylase. Toxicol. Lett. 10: 213-217.

F3 Reddin, D. G. 1982. Some general information on discriminant functions and accuracy for identifying North American and European Atlantic salmon caught at West Greenland. ICES C.M.1982/M:15. 15 p.

F3 Reddin, D. G. 1982. Reliability and corrections for size categories classifying Atlantic salmon (Salmo salar) into 1SW and MSW age groups in Newfoundland-Labrador catch records. ICES C.M.1982/M:18. 18 p.

FP3 Reddin, D. G., and J. E. Carscadden. 1982. Salmon-capelin interactions. ICES C.M.1982/M:17. 10 p.

FE3 Reddin, D. G., and D. E. Stansbury. 1982. Biological characteristics of Atlantic salmon (Salmo salar) of North American and European origin sampled at West Greenland in 1981. ICES C.M.1982/M:16. 9 p.

G1 Rice, J. C., and R. J. Belland. 1982. A simulation study of moss floras using Jaccard's coefficient of similarity. J. Biogeography 9: 411-419.

F3 Ryan, P. M. 1982. Species composition and seasonal abundance of zooplankton in the Experimental Ponds Area, central Newfoundland, 1977-80. Can. Data Rep. Fish. Aquat. Sci. 318: iv + 85 p.

O4 *Seimac. 1982. Shipboard Data Highway (Manual). Report submitted to Department of Fisheries and Oceans (Newfoundland Region).

O3 *ShawMont Martec Limited. 1982. Report on a laboratory evaluation of a mixed function oxidase system as an environmental monitor. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 26 p.

G3 Stevenson, S. C. 1982. Summary of discarding and estimates of total removals by Canadian trawlers during the 1981 Divisions 3LNO American plaice fishery. CAFSAC Res. Doc. 82/19. 9 p.

P3 Stobo, W. T., J. A. Moores, and J. J. Maguire. 1982. The herring and mackerel resources on the east coast of Canada. Can. Tech. Rep. Fish. Aquat. Sci. 1081: 27 p.

P3 Taylor, D. M. 1982. A recent development in tagging studies on snow crab, Chionoecetes opilio in Newfoundland - retention of tags through ecdysis, p. 405-417. In Proc. of the Int. Symp. on the Genus Chionoecetes, Anchorage, Alaska, May 3-6, 1982. Lowell Wakefield Fisheries Symposia Series, Univ. of Alaska, Alaska Sea Grant Rep. No. 82-10.

01 *Templeman, W. 1982. Development, occurrence and characteristics of egg capsules of the thorny skate, Raja radiata, in the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 3: 47-56.

01 *Templeman, W. 1982. Stomach contents of the thorny skate, Raja radiata, from the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 3: 123-126.

G1 Vassallo, M. I., and J. C. Rice. 1982. Ecological release and ecological flexibility in habitat use and foraging of an insular avifauna. Wilson Bull. 94: 139-155.

G1 Walsh, S. J. 1982. Distribution and abundance of pre-recruit and commercial-sized American plaice on the Grand Bank. J. Northw. Atl. Fish. Sci. 3: 149-157.

G4 Walsh, S. J. 1982. Spiny dogfish. Underwater World UW 81/013. 6 p.

G3 Wells, R. 1982. The shape of cod on the Flemish Cap. NAFO SCR Doc. 82/45, Ser. No. N834. 5 p.

G3 Wells, R. 1982. The condition factor of cod. NAFO SCR Doc. 82/46, Ser. No. N835. 3 p.

P3 Wheeler, J. P., and G. H. Winters. 1982. East coast Newfoundland herring. Same old story: stocks in decline! CAFSAC Res. Doc. 82/37. 14 p.

03 *Whitehead, H., C. Glass, and P. Harcourt. 1982. The humpback whales on the Southeast Shoal of the Grand Bank, summer 1982, with comments on other cetacean species and seabirds. Final report submitted to Ocean Studies Inc. and Department of Fisheries and Oceans (Newfoundland Region). 22 p.

01 *Whitehead, H., R. Silver, and P. Harcourt. 1982. The migration of humpback whales along the northeast coast of Newfoundland. Can. J. Zool. 60: 2173-2179.

P1 Winters, G. H. 1982. Life history and geographical patterns of growth in capelin, Mallotus villosus, of the Labrador and Newfoundland areas. J. Northw. Atl. Fish. Sci. 3: 105-114.


## PUBLICATIONS - 1983


E3 Akenhead, S. A. 1983. Mean temperatures and salinities from an ocean climate station by Newfoundland. ICES C.M.1983/C:11. 30 p. [also NAFO SCR Doc. 83/30, Ser. No. N682].

G1 Anderson, B. W., R. D. Ohmart, and J. C. Rice. 1983. Avian and vegetation community structure and their seasonal relationships in the lower Colorado River Valley. The Condor 85: 392-405 [non-aquatic publication prepared by researcher while on staff].

E3 Anderson, J. T. 1983. Larval cod and redfish from Flemish Cap, 1-3 August 1982. NAFO SCR Doc. 83/35, Ser. No. N688. 5 p.

E3 Anderson, J. T. 1983. Early life history aspects of redfish (Sebastes sp.) on Flemish Cap. ICES C.M.1983/G:12. 30 p. [also NAFO SCR Doc. 83/34, Ser. No. N687].

04 Anon. 1983. Acid rain - a Newfoundland and Labrador perspective. Communications Division, Department of Fisheries and Oceans, St. John's, Newfoundland. 12 p.

04 Anon. 1983. Arctic programs. A review prepared for the Fisheries and Oceans Research Advisory Council. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 42 p.

E4 Anon. 1983. Fisheries and oceanography: the interactions between OSS and FRB (Nfld.). A review prepared for the Fisheries and Oceans Research Advisory Council. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 84 p.

04 Anon. 1983. Organization and Management of Fisheries Research Branch. Department of Fisheries and Oceans, St. John's, Newfoundland. 76 p.

04 Anon. 1983. [illegible]ted by L. W. Coady] Program Review and Evaluation (PRE) - 1982. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 302 p.

O4 Anon. 1983. Review of Job Creation Projects 1982-83. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 22 p.

G4 Anon. 1983. [Edited by J. C. Rice] Review of selected freshwater projects (1983). Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 74 p.

O3 *Anon. 1983. Urban development: guidelines for protection of fish habitat in insular Newfoundland. Report submitted by LGL Limited to Department of Fisheries and Oceans (Newfoundland Region). 95 p.

O4 Anon. 1983. [Edited by M. C. Marcer] Newfoundland fisheries resources: today's problems and tomorrow's prospects. Text of Marine '83 Forum Seminar, St. John's, Newfoundland, November 18, 1983. 18 p.

G3 Atkinson, D. B. 1983. Redfish in NAFO Division 3M. NAFO SCR Doc. 83/33, Ser. No. N586. 8 p.

G3 Atkinson, D. B. 1983. Redfish in Divisions 3LN. NAFO SCR Doc. 83/36, Ser. No. N589. 9 p.

G3 Atkinson, D. B. 1983. Roundnose grenadier in Subareas 0+1 and 2+3. NAFO SCR Doc. 83/37, Ser. No. N590. 6 p.

G3 Atkinson, D. B. 1983. 2+3K Redfish. CAFSAC Res. Doc. 83/23. 19 p.

G3 Atkinson, D. B. 1983. Redfish of NAFO Division 3O. CAFSAC Res. Doc. 83/24. 9 p.

G3 Atkinson, D. B. 1983. An assessment of the 3P redfish stock. CAFSAC Res. Doc. 83/26. 15 p.

G2 Baird, J. W. 1983. A method to select optimum numbers for aging in a stratified approach, p. 161-164. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

G2 Baird, J. W., and S. C. Stevenson. 1983. Levels of precision - sea versus shore sampling, p. 185-188. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

E1 Banoub, J. H., Y-M. Choy, F. Michon, and D. H. Shaw. 1983. Structural investigations on the core oligosaccharide of Aeromonas hydrophila (Chemotype II) lipopolysaccharide. Carbohydr. Res. 114: 267-276.

EG1 Banoub, J. H., F. Michon, J. Rice, and L. Rateb. 1983. Kinetic studies on the rearrangement of 3,4-di-O-benzyl-1,2-O-(1-methoxyethylidene)-β-L- rhamnopyranose with a catalytic amount of 1,1,3,3-tetramethylurea- trifluoromethanesulfonic acid at different temperatures. Carbohydr. Res. 123: 109-122.

E1 Banoub, J. H., D. H. Shaw, and F. Michon. 1983. Hydrolytic release, and identification by g.l.c.-m.s., of 3-deoxy-D-manno-2-octulosonic acid in the lipopolysaccharides isolated from bacteria of the Vibrionaceae. Carbohydr. Res. 123: 117-122.

P3 Beck, P. C., E. G. Dawe, and J. Drew. 1983. Breakdown for 1982 squid (Illex illecebrosus) catches in NAFO Subarea 3, and Divisions 2J and 4R, with length and sex composition from Newfoundland inshore samples and early season offshore samples. NAFO SCR Doc. 83/21, Ser. No. N570. 15 p.

G4 Bishop, C. A. 1983. The northern cod stock, p. 19-24. In Nan Hennessey [ed.] The Newfoundland and Labrador environment: a collection of case studies. Jesperson Press, St. John's.

G3 Bishop, C. A., and S. Gavaris. 1983. An assessment of the cod stock in NAFO Divisions 3NO. NAFO SCR Doc. 83/53, Ser. No. N711. 26 p.

G3 Bishop, C. A., and S. Gavaris. 1983. Assessment of the cod stock in Subdivision 3Ps. CAFSAC Res. Doc. 83/52. 36 p.

G3 Bourgeois, C. E., and I-H. Ni. 1983. Metazoan parasites of Northwest Atlantic redfishes (Sebastes spp.). NAFO SCR Doc. 83/95, Ser. No. N763. 12 p.

P1 Bowen, W. D., and D. E. Sergeant. 1983. Mark-recapture estimates of harp seal pup (Phoca groenlandica) production in the Northwest Atlantic. Can. J. Fish. Aquat. Sci. 40: 728-742.

P1 Bowen, W. D., D. E. Sergeant, and T. Øritsland. 1983. Validation of age estimation in the harp seal, Phoca groenlandica, using dentinal annuli. Can. J. Fish. Aquat. Sci. 40: 1430-1441.

G1 Bowering, W. R. 1983. Age, growth, and sexual maturity of Greenland halibut, Reinhardtius hippoglossoides (Walbaum), in the Canadian Northwest Atlantic. Fish. Bull. 81: 599-611.

G3 Bowering, W. R. 1983. Certain biological characteristics of Greenland halibut (Reinhardtius hippoglossoides) in the Canadian Northwest Atlantic and their significance for stock identification. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 118 p.

G3 Bowering, W. R. 1983. By-catch levels of Greenland halibut in the roundnose grenadier directed fishery of NAFO Subareas 2+3. NAFO SCR Doc. 83/28, Ser. No. N680. 4 p.

G3 Bowering, W. R. 1983. Some biological considerations of witch flounder on the southern Grand Bank (NAFO Divisions 3NO). NAFO SCR Doc. 83/56, Ser. No. N714. 7 p.

G3 Bowering, W. R. 1983. The northeast Newfoundland witch flounder "stock" (Divisions 2J3KL). CAFSAC Res. Doc. 83/29. 16 p.

G4 Bowering, W. R. 1983. Turbot (Greenland halibut). Underwater World, DFO/491, UW/24. 5 p.

G3 Bowering, W. R., and W. B. Brodie. 1983. An evaluation of the Greenland halibut (Reinhardtius hippoglossoides) stock complex in NAFO Subarea 2 and Divisions 3KL. NAFO SCR Doc. 83/55, Ser. No. N713. 17 p.

GP3 Bowering, W. R., D. G. Parsons, and G. R. Lilly. 1983. Predation on shrimp (Pandalus borealis) by Greenland halibut (Reinhardtius hippoglossoides) and Atlantic cod (Gadus morhua) off coastal Labrador (Div. 2H and 2J). NAFO SCR Doc. 83/88, Ser. No. N754. 26 p.

GE3 Bowering, W. R., and D. E. Stansbury. 1983. Regression of weight on length of Greenland halibut (Reinhardtius hippoglossoides) in the Canadian Northwest Atlantic. NAFO SCR Doc. 83/18, Ser. No. N667. 14 p.

GE3 Bowering, W. R., and D. E. Stansbury. 1983. Regressions of weight on length of witch flounder (Glyptocephalus cynoglossus) in the eastern Newfoundland area (NAFO Divisions 2J+3KL). NAFO SCR Doc. 83/19, Ser. No. N668. 10 p.

G3 Brodie, W. B. 1983. By-catch of yellowtail in the American plaice fishery in NAFO Divisions 3L, 3N and 3O. CAFSAC Res. Doc. 83/72. 54 p.

G3 Brodie, W. B., and T. K. Pitt. 1983. A stock assessment for yellowtail flounder in NAFO Divisions 3L, 3N, and 3O. NAFO SCR Doc. 83/57, Ser. No. N715. 14 p.

G3 Brodie, W. B., and T. K. Pitt. 1983. American plaice in NAFO Divisions 3L, 3N and 3O - a stock assessment update. NAFO SCR Doc. 83/58, Ser. No. N716. 16 p.

G3 Brodie, W. B., and T. K. Pitt. 1983. Assessment of American plaice in NAFO Subdivision 3Ps for 1982. CAFSAC Res. Doc. 83/35. 9 p.

G3 Brodie, W. B., and T. K. Pitt. 1983. American plaice in NAFO Subarea 2 and Division 3K. CAFSAC Res. Doc. 83/45. 12 p.

P3 Carscadden, J. 1983. Observations on the 1982 experimental capelin fishery in Div. 2J3K and the inshore capelin fishery in Div. 3KL. NAFO SCR Doc. 83/48, Ser. No. N706. 4 p.

P4 Carscadden, J. 1983. Biologists and fishermen working together for the long- term management of the capelin stock. Newfoundland Lifestyle 1(2): 27.

P3 Carscadden, J. E. 1983. Capelin as a forage species: a review of selected studies. NAFO SCR Doc. 83/72, Ser. No. N738. 7 p.

P3 Carscadden, J. E. 1983. Population dynamics and factors affecting the abundance of capelin (Mallotus villosus) in the Northwest Atlantic. FAO Fisheries Report 291, Vol. 3: 789-812.

P2 Carscadden, J. E., D. S. Miller, J. A. Moores, and B. S. Nakashima. 1983. The sampling program for herring and capelin in Newfoundland, p. 209-216. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

E3 Chadwick, E.M.P., and G. T. Evans. 1983. Influence of variations in freshwater growth on yield of Atlantic salmon. CAFSAC Res. Doc. 83/52. 8 p.

04 Coady, L. W. 1983. The Arctic char fishery, p. 11-18. In Nan Hennessey [ed.] The Newfoundland and Labrador environment: a collection of case studies. Jesperson Press, St. John's.

03 Coady, L. W., J. S. Scott, J. Boulva, and J. P. Lussiaà-Berdou. 1983. Canadian research report, 1982. NAFO SCS Doc. 83/11, Ser. No. N673. 18 p.

P1 Dalley, E. L., C. W. Andrews, and J. M. Green. 1983. Precocious male Atlantic salmon parr (Salmo salar) in insular Newfoundland. Can. J. Fish. Aquat. Sci. 40: 647-652.

PG3 Dawe, E. G., G. R. Lilly, and H. J. Drew. 1983. Predation by short-finned squid (Illex illecebrosus) in Newfoundland inshore waters. NAFO SCR Doc. 83/74, Ser. No. N740. 16 p.

F3 Dempson, J. B. 1983. Evaluation of the 1982 commercial Arctic charr, Salvelinus alpinus, fishery in Hebron Fiord, northern Labrador. CAFSAC Res. Doc. 83/7. 11 p.

F3 Dempson, J. B. 1983. Dynamics of an exploited northern Labrador anadromous Arctic charr (Salvelinus alpinus) population, p. 19-34. In Proceedings of the Second ISACF Workshop on Arctic Charr, 1982. ISACF Information Series No. 2.

F3 Dempson, J. B., and G. Furey. 1983. Summary of catch and effort statistics in the recreational and commercial Labrador Atlantic salmon, Salmo salar, fishery, 1982. CAFSAC Res. Doc. 83/9. 14 p.

F3 Dempson, J. B., and L. J. LeDrew. 1983. Stock assessment of Arctic charr, Salvelinus alpinus, populations in Volsey Bay, Anaktalik Bay and Okak Bay, northern Labrador. CAFSAC Res. Doc. 83/8. 17 p.

F3 Dempson, J. B., and L. J. LeDrew. 1983. Status of the Arctic charr stock (Salvelinus alpinus) in Tikkoatdkak Bay and stock projections for 1983. CAFSAC Res. Doc. 83/14. 13 p.

F1 Dempson, J. B., L. J. LeDrew, and G. Furey. 1983. Occurrence of American shad (Alosa sapidissima) in northern Labrador waters. Nat. Can. (Que.) 110: 217-221.

E4 Dey, A., J. W. Kiceniuk, and J. F. Payne. 1983. The effects of long term exposure to crude petroleum on selected biochemical indices in marine fish. Toxicol. Lett. 18 (Suppl. 1): 125.

E1 Dey, A. C., J. W. Kiceniuk, U. P. Williams, R. A. Khan, and J. F. Payne. 1983. Long term exposure of marine fish to crude petroleum - I. Studies on liver lipids and fatty acids in cod (Gadus morhua) and winter flounder (Pseudopleuronectes americanus). Comp. Biochem. Physiol. 75C: 93-101.

04 *Dobrocky Seatech (Nfld.) Ltd. 1983. Digitization of selected riversheds along the south coast of Newfoundland. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 97 p.

04 *Dobrocky Seatech (Nfld.) Ltd. 1983. Identification and enumeration of nannoplankton samples from the Newfoundland Experimental Ponds Area (1982 data). Report submitted to Department of Fisheries and Oceans (Newfoundland Region).

P1 Ennis, G. P. 1983. Annual variations in standing stock in a Newfoundland population of lobsters. N. Am. J. Fish. Manage. 3: 26-33.

P3 Ennis, G. P. 1983. The effect of wind direction on the abundance and distribution of decapod crustacean larvae in a Newfoundland near-shore area. Can. Tech. Rep. Fish. Aquat. Sci. 1138: iv + 19 p.

P3 Ennis, G. P. 1983. Observations on the behavior and activity of lobsters, Homarus americanus, in nature. Can. Tech. Rep. Fish. Aquat. Sci. 1165: v + 26 p.

P3 Ennis, G. P. 1983. Variation in annual growth in two Newfoundland lobster (Homarus americanus) populations in relation to temperature conditions. ICES C.M.1983/K:24. 11 p.

P3 Ennis, G. P., and P. W. Collins. 1983. A computer program to assess egg production per recruit in a lobster (Homarus americanus) population. Can. Tech. Rep. Fish. Aquat. Sci. 1198: iv + 15 p.

P3 Fréchette, J., and D. G. Parsons. 1983. Report of Shrimp Ageing Workshop held at Ste. Foy, Quebec, in May and at Dartmouth, Nova Scotia, in November 1981. NAFO Sci. Coun. Studies 6: 79-100 [also NAFO SCS Doc. 82/14, Ser. No. N643].

03 *Gardner, G. A., and E. T. Howell. 1983. Zooplankton distribution across the shelf break on the Southeast Shoal of the Newfoundland Grand Banks in May 1981. Can. MS Rep. Fish. Aquat. Sci. 1724: iv + 61 p.

04 Gavaris, S. 1983. Comments on estimating partial recruitment in virtual population analysis. Can. J. Fish. Aquat. Sci. 40: 382-384.

G3 Gavaris, S. 1983. Status of the cod stock in Division 3M. NAFO SCR Doc. 83/64, Ser. No. N725. 4 p.

G3 Gavaris, S., and C. A. Bishop. 1983. Assessment of the cod stock in Divisions 2J3KL. NAFO SCR Doc. 83/54, Ser. No. N712. 20 p.

G3 Gavaris, S., and C. A. Bishop. 1983. Analysis of the cod stock in Divisions 2GH. CAFSAC Res. Doc. 83/20. 7 p.

G2 Gavaris, S., and C. A. Gavaris. 1983. Estimation of catch at age and its variance for groundfish stocks in the Newfoundland region, p. 178-182. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

F1 Gibson, R. J. 1983. Large Atlantic salmon parr (Salmo salar) of a boreal river in Québec. Nat. Can. (Que.) 110: 135-141.

F1 Gibson, R. J. 1983. Water velocity as a factor in the change from aggressive to schooling behaviour and subsequent migration of Atlantic salmon smolt (Salmo salar). Nat. Can. (Que.) 110: 143-148.

F4 Gibson, R. J., and T. R. Porter. 1983. Letter to editor in response to commentary by Dr. W. Carter. Atl. Salmon J. XXXII(1): 37.

P3 Hay, K., and D. Wakeham. 1983. Use of catch and effort data to estimate the pup production of hooded seals (Cystophora cristata) at Newfoundland. NAFO SCR Doc. 83/51, Ser. No. N709. 12 p.

O4 *Hurley Fisheries Consulting. 1983. Identification and counting of invertebrates in Ekman grab samples from ponds in central Newfoundland. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 46 p.

P3 Hurley, G. V., P. O'Dense, R. K. O'Dor, and E. G. Dawe. 1983. First marking of squid (Illex illecebrosus) statoliths with tetracycline and strontium in captivity. NAFO SCR Doc. 83/31, Ser. No. N684. 8 p.

E1 Ishiguro, E. E., T. Ainsworth, D. H. Shaw, W. W. Kay, and T. J. Trust. 1983. A lipopolysaccharide-specific bacteriophage for Aeromonas salmonicida. Can. J. Microbiol. 29: 1458-1461.

O3 *Kendaris, T. A. 1983. An acid rain inventory survey of selected Labrador lakes. Report submitted by Dobrocky Seatech (Nfld.) Ltd. to Department of Fisheries and Oceans (Newfoundland Region). 134 p.

E1 Khan, R. A., and J. W. Kiceniuk. 1983. Effects of crude oil on gastrointestinal parasites of two species of marine fish. J. Wildl. Dis. 19: 253-258.

E2 Kiceniuk, J. W., and R. A. Khan. 1983. Toxicology of chronic crude oil exposure: sublethal effects on aquatic organisms, p. 425-436. In J. O. Nriagu [ed.] Aquatic toxicology. John Wiley and Sons, Inc., N.Y.

G3 Kulka, D. W. 1983. Method for determination of fish production conversion factors on commercial factory trawlers. CAFSAC Res. Doc. 83/25. 32 p.

G3 Kulka, D. W. 1983. Analysis of fish production conversion data collected in 1981 from the Northwest Atlantic. CAFSAC Res. Doc. 83/38. 14 p.

G3 Kulka, D. W. 1983. Analysis of cod fillet production conversion factor data from EEC vessels fishing in the Northwest Atlantic, 1982-83. CAFSAC Res. Doc. 83/40. 15 p.

G2 Kulka, D. W., and D. Waldron. 1983. The Atlantic observer programs - a discussion of sampling from commercial catches at sea, p. 255-262. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

G4 Lear, W. H. 1983. Arctic cod. Underwater World, DFO/590, UW/25E. 6 p.

G4 Lear, W. H., C. A. Bishop, and P. R. Hood. 1983. Trap cod: some facts about unpredictable catches and small fish. Communications Division, Department of Fisheries and Oceans, St. John's, Newfoundland. 16 p.

O3 *LeGrew Environmental Management Ltd. 1983. Results of a preliminary limnological survey of Lloyd's Lake, Newfoundland, and electrofishing at Joe Glades Brook, Newfoundland. Report submitted to Department of Fisheries and Oceans (Nfld. Region). 31 p.

E4 Lee, Y-Z., J. Payne, P. J. O'Brien, and A. Rahimtula. 1983. Toxic and biochemical effects of benzene and gasoline exposure on the avian embryo (Abstract). Can. Fed. Biol. Soc. 26: 99.

P3 Leggett, W. C., K. T. Frank, and J. E. Carscadden. 1983. Estimating year-class strength in capelin (Mallotus villosus) from abiotic variables. NAFO SCR Doc. 83/52, Ser. No. N710. 17 p.

G3 Lilly, G. R. 1983. The food of cod on Flemish Cap in winter 1983. NAFO SCR Doc. 83/65, Ser. No. N726. 7 p.

G3 Lilly, G. R., and J. C. Rice. 1983. Food of Atlantic cod (Gadus morhua) on the northern Grand Bank in spring. NAFO SCR Doc. 83/87, Ser. No. N753. 35 p.

F1 MacCrimmon, H. R., T. A. Dickson, and R. J. Gibson. 1983. Implications of differences in emergent times on growth and behaviour of juvenile Atlantic salmon (Salmo salar) and brook charr (Salvelinus fontinalis) in sympatric stream populations. Nat. Can. (Que.) 110: 379-384.

O3 *Mahoney, E. M., and R. G. Buggeln. 1983. Seasonal variations in the concentration of Oikopleura spp. (Tunicata: Appendicularia) in Conception Bay, Newfoundland. Can. Tech. Rep. Fish. Aquat. Sci. 1155: 12 p.

G4 McKone, W. D., and E. M. LeGrow. 1983. Thorny and smooth skates. Underwater World, DFO/589, UW/21E. 5 p.

O4 Mercer, M. C. 1983. The Atlantic fisheries. Newfoundland Lifestyle 1(2): 27-28.

E3 Michon, F. 1983. Structural studies on the lipopolysaccharides isolated from bacteriophage selected strains of Aeromonas hydrophila. Ph.D. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 151 p.

E4 *Michon, F. 1983. A comprehensive report on the experimental work (microbial chemistry) conducted at the Northwest Atlantic Fisheries Centre during the period of November 1980 to January 1983. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 90 p.

P3 Miller, D. S., and J. E. Carscadden. 1983. Capelin acoustic surveys NAFO Divisions 2J3K and 3LNO, 1982. NAFO SCR Doc. 83/50, Ser. No. N708. 10 p.

P3 Misra, R. K., and J. E. Carscadden. 1983. Stock discrimination of capelin (Mallotus villosus) in the Northwest Atlantic using meristic characters. NAFO SCR Doc. 83/49, Ser. No. N707. 10 p.

G1 Misra, R. K., and I-H. Ni. 1983. Distinguishing beaked redfishes (deepwater redfish, Sebastes mentella and Labrador redfish, S. fasciatus), by discriminant analysis (with covariance) and multivariate analysis of covariance. Can. J. Fish. Aquat. Sci. 40: 1507-1511.

P3 Moores, J. A. 1983. A re-examination of the catch matrix utilized for the assessment of the Newfoundland west coast herring stock. CAFSAC Res. Doc. 83/6. 25 p.

F3 Myers, R. A. 1983. Evolutionary change in the proportion of precocious parr and its effect on yield in Atlantic salmon. ICES C.M.1983/M:13. 16 p.

P4 Naidu, K. S., and F. M. Cahill. 1983. Scallop culture report, 1981-82. Report submitted to the Department of Fisheries, Government of Newfoundland and Labrador. 51 p.

P3 Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1983. Scallop survey in NAFO Division 3Ps (including Green, St. Pierre and Burgeo Banks). CAFSAC Res. Doc. 83/4. 27 p.

P3 Naidu, K. S., D. B. Lewis, and F. M. Cahill. 1983. St. Pierre Bank: an offshore scallop buffer zone. CAFSAC Res. Doc. 83/16. 48 p.

P3 Nakashima, B. S. 1983. Differences in mean lengths and percentages of females in capelin schools. NAFO SCR Doc. 83/46, Ser. No. N704. 5 p.

P4 Nakashima, B. S. 1983. Aerial photography of capelin schools. Survey (Spring 1983), p. 2-3.

P3 Nakashima, B. S., and R. W. Harnum. 1983. Summary of a logbook survey of the 1982 inshore capelin fishery in Division 3KL. NAFO SCR Doc. 83/47, Ser. No. N705. 9 p.

G4 Ni, I-H. 1983. Reply to comment on meristic variation in beaked redfishes, Sebastes mentella and S. fasciatus, in Northwest Atlantic. Can. J. Fish. Aquat. Sci. 40: 1535-1536.

G3 Ni, I-H., and W. D. McKone. 1983. Distribution and concentration of redfishes in Newfoundland and Labrador waters. NAFO Sci. Coun. Studies 6: 7-14 [also NAFO SCR Doc. 81/69, Ser. No. N353].

O4 *OceanChem Ltd. 1983. Analysis of chlorophyll and nutrients in water samples from the South-east Shoal, Grand Banks of Newfoundland. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 84 p.

F3 O'Connell, M. F., J. P. Davis, and D. C. Scott. 1983. An assessment of the stocking of Atlantic salmon (Salmo salar L.) fry on the tributaries of the Middle Exploits River, Newfoundland (1968-80). Can. Tech. Rep. Fish. Aquat. Sci. 1225: v + 142 p.

F3 O'Connell, M. F., J. B. Dempson, D. G. Reddin, and E.G.M. Ash. 1983. Status of Atlantic salmon stocks in Newfoundland and Labrador, 1983. CAFSAC Res. Doc. 83/80. 67 p.

F3 O'Connell, M. F., and D. G. Reddin. 1983. Egg depositions in some Newfoundland rivers. CAFSAC Res. Doc. 83/15. 10 p.

P3 Parsons, D. G. 1983. Observations on the abundance and distribution of predators of shrimp (Pandalus borealis) in the Cartwright and Hopedale Channels. CAFSAC Res. Doc. 83/12. 15 p.

P3 Parsons, D. G. 1983. Assessment methodology for Northwest Atlantic shrimp stocks. CAFSAC Res. Doc. 83/13. 18 p.

P2 Parsons, D. G., E. G. Dawe, G. P. Ennis, K. S. Naidu, and D. M. Taylor. 1983. Sampling of commercial catches for invertebrates in Newfoundland, p. 39-51. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

P3 Parsons, D. G., G. E. Tucker, and P. J. Veitch. 1983. Status of the northern shrimp (Pandalus borealis) resources in the Hopedale and Cartwright Channels (Div. 2H and 2J) considering decreasing fishing effort in recent years. CAFSAC Res. Doc. 83/10. 27 p.

P3 Parsons, D. G., P. J. Veitch, and G. E. Tucker. 1983. The Canadian fishery for shrimp (Pandalus borealis) in Division 0A, 1982. NAFO SCR Doc. 83/2, Ser. No. N640. 21 p.

P3 Parsons, D. G., P. J. Veitch, and G. E. Tucker. 1983. Distribution, abundance and some biological characteristics of the striped pink shrimp (Pandalus montagui) in the eastern Hudson Strait and Ungava Bay. CAFSAC Res. Doc. 83/11. 28 p.

E4 Payne, J. F. 1983. Mixed-function oxygenases in biological monitoring programs: status of potential usage with different marine animal phyla [Abstract], p. 24-25. In International Symposium on Ecotoxicological Testing for the Marine Environment (Abstracts of Reviews and Experience Papers), State University of Ghent, Belgium, September 12-14, 1983.

E1 Payne, J. F., J. Kiceniuk, R. Misra, G. L. Fletcher, and R. J. Thompson. 1983. Sublethal effects of petroleum hydrocarbons on adult American lobsters (Homarus americanus). Can. J. Fish. Aquat. Sci. 40: 705-717.

E4 Payne, J. F., A. Rahimtula, and S. Lim. 1983. Metabolism of petroleum hydrocarbons by marine organisms: the potential of bivalve molluscs [Abstract]. Can. Fed. Biol. Soc. 26: 99.

F3 Pepper, V. A., T. Nicholls, and N. P. Oliver. 1983. Atlantic salmon fry rearing experiments in Newfoundland during 1982. ICES C.M.1983/M:14. 23 p.

F3 Pepper, V. A., and M. F. O'Connell. 1983. Coded wire microtag applications in Newfoundland, the first three years. ICES C.M.1983/M:15. 14 p.

F3 Pippy, J.H.C. 1983. Administrative Report of the Anadromous and Catadromous Fish Committee. ICES C.M.1983/M:1. 45 p.

F4 Porter, R, and J. Finn. 1983. Are there fewer salmon in the rivers on the Avalon today than there were 25 years ago? Salar Alert Newsletter, Salmon Association of Eastern Newfoundland, June 1983, p. 3-4.

F3 Porter, T. R., and E.M.P. Chadwick. 1983. Assessment of Atlantic salmon stocks in Statistical Areas K and L, western Newfoundland, 1982. CAFSAC Res. Doc. 83/87. 66 p.

F3 Porter, T. R., and J. B. Dempson. 1983. A research program on an unexploited anadromous Arctic charr, Salvelinus alpinus stock, p. 143-152. In Proceedings of the Second ISACF Workshop on Arctic Charr, 1982. ISACF Information Series No. 2.

G3 Power, D. J., and I-H. Ni. 1983. Morphometric classification between golden redfish (Sebastes marinus) and beaked redfishes (S. mentella and S. fasciatus). NAFO SCR. Doc. 83/94, Ser. No. N762. 10 p.

P3 Pringle, J. D., D. G. Robinson, G. P. Ennis, and P. Dubé. 1983. An overview of the management of the lobster fishery in Atlantic Canada. Can. MS Rep. Fish. Aquat. Sci. 1701: vii + 62 p.

P3 Pringle, J. D., D. G. Robinson, G. P. Ennis, and P. Dubé. 1983. A brief overview of the management of the lobster fishery in Atlantic Canada [an executive summary of Can. MS Rep. Fish. Aquat. Sci. 1701]. 24 p.

F3 Reddin, D. G. 1983. Conversion factors for Newfoundland-Labrador commercial Atlantic salmon fishery statistics. CAFSAC Res. Doc. 83/71. 13 p.

F3 Reddin, D. G., and R. F. Burfitt. 1983. An update: the use of scale characters and multivariate analysis to discriminate between Atlantic salmon (Salmo salar L.) of North American and European origin caught at West Greenland. ICES C.M.1983/M:11. 14 p.

G1 Rice, J. C., R. D. Ohmart, and B. W. Anderson. 1983. Turnovers in species composition of avian communities in contiguous riparian habitats. Ecology 64: 1444-1455 [non-aquatic publication prepared by researcher while on staff].

P1 Roff, D. A., and W. D. Bowen. 1983. Population dynamics and management of the Northwest Atlantic harp seal (Phoca groenlandica). Can. J. Fish. Aquat. Sci. 40: 919-932.

F4 Ryan, P. M. 1983. Variation in abundance and diversity of crustacean zooplankton in two small, shallow lakes in central Newfoundland, Canada [Abstract]. Int. Ver. Theor. Angew. Limnol. Verh. 22: 306.

F3 Ryan, P. M. 1983. Computer code for freshwater life forms of Newfoundland: Part 1 - Animals. Can. MS Rep. Fish. Aquat. Sci. 1729: iv + 159 p.

F3 Ryan, P. M. 1983. Computer code for freshwater life forms of Newfoundland: Part 2 - Plants. Can. MS Rep. Fish. Aquat. Sci. 1729: iv + 122 p.

F3 Scruton, D. A. 1983. A survey of headwater lakes in insular Newfoundland, with special reference to acid precipitation. Can. Tech. Rep. Fish. Aquat. Sci. 1195: v + 110 p.

G3 Seiler, J. H., and E. J. Sandeman. 1983. Real progress in oceanographic data systems, p. 133-137. In Proc. Oceans '83 (Vol. 1), San Francisco, Calif., Aug. 29-Sept. 1, 1983. Effective use of the sea: an update.

E1 Shaw, D. H., Y-Z. Lee, M. J. Squires, and O. Lüderitz. 1983. Structural studies on the O-antigen of Aeromonas salmonicida. Eur. J. Biochem. 131: 633-638.

G2 Stevenson, S. C. 1983. A review of the sampling of commercial groundfish catches in Newfoundland, p. 29-38. In W. G. Doubleday and D. Rivard [ed.] Sampling commercial catches of marine fish and invertebrates. Can. Spec. Publ. Fish. Aquat. Sci. 66.

G3 Stevenson, S. C. 1983. Summary of discarding and estimates of total removals by Canadian (Nfld.) trawlers during the 1982 Divisions 3LNO American plaice fishery. NAFO SCR Doc. 83/27, Ser. No. N678. 7 p.

P3 Taylor, D. M., and P. G. O'Keefe. 1983. Assessment of snow crab (Chionoecetes opilio) stocks in Newfoundland in 1980. CAFSAC Res. Doc. 83/3. 40 p.

P3 Taylor, D. M., W. R. Squires, and P. G. O'Keefe. 1983. An alternate methodology for estimating snow crab (Chionoecetes opilio) populations in commercially fished areas. CAFSAC Res. Doc. 83/1. 10 p.

G3 *Templeman, W. 1983. Stock discrimination in marine fishes. NAFO Sci. Coun. Studies 6: 57-63 [also NAFO SCR Doc. 82/79, Ser. No. N585].

P3 Tremblay, D., H. Powles, and J. Moores. 1983. Status of the 4R herring stock in 1982. CAFSAC Res. Doc. 83/33. 40 p.

E1 Truscott, B., J. M. Walsh, M. P. Burton, J. F. Payne, and D. R. Idler. 1983. Effect of acute exposure to crude petroleum on some reproductive hormones in salmon and flounder. Comp. Biochem. Physiol. 75C: 121-130.

E1 Walton, D. G., L. L. Fancey, J. M. Green, J. W. Kicenluk, and W. R. Penrose. 1983. Seasonal changes in aryl hydrocarbon hydroxylase activity in a marine fish Tautogolabrus adspersus (Walbaum) with and without petroleum exposure. Comp. Biochem. Physiol. 76C: 247-253.

G3 Wells, R. 1983. An examination of age compositions estimated for cod of the Flemish Cap in the period 1977-82. NAFO SCR Doc. 83/26, Ser. No. N677. 13 p.

G3 Wells, R. 1983. Distribution and abundance of cod on the Flemish Cap, 1977-83. NAFO SCR Doc. 83/29, Ser. No. N681. 8 p.

G3 Wells, R. 1983. Changes in average length-at-age of cod on the Flemish Cap. NAFO SCR Doc. 83/42, Ser. No. N699. 3 p.

P3 Wheeler, J. P., and G. H. Winters. 1983. 1982 east coast Newfoundland herring assessment. CAFSAC Res. Doc. 83/18. 31 p.

G3 White, G. N., and S. Gavaris. 1983. Diagnosis for the multiplicative model. CAFSAC Res. Doc. 83/58. 27 p.

P1 Winters, G. H. 1983. Analysis of the biological and demographic parameters of northern sand lance, Ammodytes dubius, from the Newfoundland Grand Bank. Can. J. Fish. Aquat. Sci. 40: 409-419.

## PUBLICATIONS - 1984

E3 Akenhead, S. A. 1984. A preliminary compendium of Flemish Cap research cruises, 1977-1984. NAFO SCR Doc. 84/80, Ser. No. N869. 7 p.

E3 Akenhead, S. A. 1984. Ocean climate at Station 27, report for 1983. NAFO SCR Doc. 84/81, Ser. No. N870. 2 p.

E1 Anderson, J. T. 1984. Early life history of redfish (Sebastes spp.) on Flemish Cap. Can. J. Fish. Aquat. Sci. 41: 1106-1116.

E4 Anderson, J. T., and G. A. Gardner. 1984. Biological communities and physical oceanography near Lilly Canyon, Grand Banks of Newfoundland [Abstract]. EOS 64(52): 1050.

O4 Anon. 1984. [Edited by L. W. Coady] Program Review and Evaluation (PRE) - 1983. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 300 p.

E3 Anon. 1984. [Edited by R. J. Wiseman and R. Côté] Environmental risks from offshore exploration - an overview prepared for the "Ocean Ranger" Commission. Fisheries and Oceans, Newfoundland Region; Environment Canada, Atlantic Region. 48 p.

F3 Anon. 1984. [Compiled by J. D. Pratt] Salmon resource development in Newfoundland and Labrador. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 500 p.

F3 Anon. 1984. [Compiled by J. D. Pratt] Salmon resource development in Newfoundland and Labrador (Summary). Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 37 p.

O4 Anon. 1984. Organization and Management of Fisheries Research Branch (1984-85). Department of Fisheries and Oceans, St. John's, Newfoundland. 78 p.

O4 Anon. 1984. Review of NEED (New Employment Expansion and Development) Projects (1983-84). Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 14 p.

F3 Ash, E.G.M. 1984. Atlantic salmon commercial catch statistics, Newfoundland and Labrador, 1982. Can. Data Rep. Fish. Aquat. Sci. 478: iv + 115 p.

FE3 Ash, E.G.M., and R. J. Tucker. 1984. Angled catch and effort data for Atlantic salmon in Newfoundland and Labrador, and for other fishes in Labrador, 1982. Can. Data Rep. Fish. Aquat. Sci. 465: xv + 96 p.

G1 Atkinson, D. B. 1984. Discarding of small redfish in the shrimp fishery off Port au Choix, Newfoundland, 1976-80. J. Northw. Atl. Fish. Sci. 5: 99-102.

G1 Atkinson, D. B. 1984. Distribution and abundance of beaked redfish in the Gulf of St. Lawrence, 1976-81. J. Northw. Atl. Fish. Sci. 5: 189-197.

G3 Atkinson, D. B. 1984. An update on the status of roundnose grenadier in Subareas 0+1 and 2+3. NAFO SCR Doc. 84/20, Ser. No. N793. 6 p.

G3 Atkinson, D. B. 1984. The relationships between different type of length measurements of sharp-beaked redfish. NAFO SCR Doc. 84/21, Ser. No. N794. 3 p.

G3 Atkinson, D. B. 1984. Redfish in NAFO Divisions 3LN. NAFO SCR Doc. 84/31, Ser. No. N816. 9 p.

G3 Atkinson, D. B. 1984. Flemish Cap redfish. NAFO SCR Doc. 84/32, Ser. No. N817. 8 p.

G3 Atkinson, D. B. 1984. The redfish in Div. 3O - an update. CAFSAC Res. Doc. 84/32. 7 p.

G3 Atkinson, D. B., and I-H. Ni. 1984. Division 3P redfish. CAFSAC Res. Doc. 84/31. 17 p.

E1 Bal, A. K., A. C. Dey, and M. C. Hampson. 1984. Resting sporangium of Synchytrium endobioticum: its structure and composition of the lipids and fatty acids. Arch. Microbiol. 140: 178-182.

E4 Bal, A. K., A. C. Dey, and M. C. Hampson. 1984. Lipid classes and fatty acid distribution in the resting sporangium of Synchytrium endobioticum [Abstract]. Can. J. Plant Pathol. 6: 259.

E4 Bal, A. K., A. C. Dey, and M. C. Hampson. 1984. Resting sporangium wall of Synchytrium endobioticum: characterization of lipid classes and fatty acid distribution [Abstract]. Am. Soc. Cell Biol., Kansas City, 1984.

E1 Banoub, J. H., F. Michon, D. H. Shaw, and R. Roy. 1984. E.i. and c.i. mass-spectral identification of some derivatives of 7-O-(2-amino-2-deoxy-α-D-glucopyranosyl)-L-glycero-D-manno-heptose, obtained from lipopolysaccharides representative of the Vibrionaceae Family. Carbohydr. Res. 128: 203-216.

E1 Barnes, M. A., and G. Power. 1984. A comparison of otolith and scale ages for western Labrador lake whitefish. Environ. Biol. Fishes 10: 297-299.

E1 Barnes, M. A., G. Power, and R.G.H. Downer. 1984. Stress-related changes in lake whitefish (Coregonus clupeaformis) associated with a hydroelectric control structure. Can. J. Fish. Aquat. Sci. 41: 1528-1533.

G3 Bishop, C. A. 1984. Estimates of age at maturity for cod in Subdivision 3Ps. NAFO SCR Doc. 84/122, Ser. No. N921. 3 p.

G3 Bishop, C. A. 1984. A comparison of the influence of stratification by depth zone and by individual strata on research vessel abundance estimates. CAFSAC Res. Doc. 84/25. 19 p.

G3 Bishop, C. A. 1984. Recent changes in haddock abundance on the Grand Bank and St. Pierre Bank. CAFSAC Res. Doc. 84/67. 16 p.

G4 Bishop, C. A. 1984. White hake. Underwater World, DFO/1247, UW/40. 4 p.

G3 Bishop, C. A., and S. Gavaris. 1984. Analysis of cod stocks in NAFO Div. 2GH. CAFSAC Res. Doc. 84/68. 9 p.

G3 Bishop, C. A., S. Gavaris, and J. W. Baird. 1984. Assessment of the cod stock in NAFO Divisions 3NO. NAFO SCR Doc. 84/52, Ser. No. N839. 22 p.

G3 Bishop, C. A., S. Gavaris, and J. W. Baird. 1984. An assessment of the cod stock in Subdivision 3Ps. NAFO SCR Doc. 84/53, Ser. No. N840. 27 p.

FG1 Bourgeois, C. E., and I-H. Ni. 1984. Metazoan parasites of Northwest Atlantic redfishes (Sebastes spp.). Can. J. Zool. 62: 1879-1885.

G1 Bowering, W. R. 1984. Migrations of Greenland halibut, Reinhardtius hippoglossoides, in the Northwest Atlantic from tagging in the Labrador-Newfoundland region. J. Northw. Atl. Fish. Sci. 5: 85-91.

G3 Bowering, W. R. 1984. The fishery for Greenland halibut in NAFO Subarea 0+1. NAFO SCR Doc. 84/60, Ser. No. N849. 5 p.

G3 Bowering, W. R. 1984. Distribution and relative abundance of the Labrador-eastern Newfoundland stock complex of Greenland halibut (Reinhardtius hippoglossoides). NAFO SCR Doc. 84/61, Ser. No. N850. 14 p.

G3 Bowering, W. R. 1984. Witch flounder in NAFO Divisions 3NO. NAFO SCR Doc. 84/63, Ser. No. N832. 4 p.

G3 Bowering, W. R. 1984. Witch flounder in NAFO Subdivision 3Ps. CAFSAC Res. Doc. 84/42. 9 p.

G3 Bowering, W. R. 1984. Witch flounder in NAFO Divisions 2J3KL. CAFSAC Res. Doc. 84/46. 14 p.

G1 Bowering, W. R., and W. B. Brodie. 1984. Distribution of witch flounder in the northern Gulf of St. Lawrence and changes in its growth and sexual maturity patterns. N. Am. J. Fish. Manage. 4A: 399-413.

G3 Bowering, W. R., and W. B. Brodie. 1984. An assessment of the Greenland halibut (Reinhardtius hippoglossoides) stock complex in NAFO Subarea 2 and Division 3KL. NAFO SCR Doc. 84/62, Ser. No. N851. 19 p.

G3 Bowering, W. R., and W. B. Brodie. 1984. Distribution of witch flounder in the northern Gulf of St. Lawrence and changes in its growth and sexual maturity patterns. ICES C.M.1984/G:52. 27 p.

GP3 Bowering, W. R., D. G. Parsons, and G. R. Lilly. 1984. Predation on shrimp (Pandalus borealis) by Greenland halibut (Reinhardtius hippoglossoides) and Atlantic cod (Gadus morhua) off Labrador. ICES C.M.1984/G:54. 30 p.

GE1 Bowering, W. R., and D. E. Stansbury. 1984. Regressions of weight on length for witch flounder, Glyptocephalus cynoglossus, of the eastern Newfoundland area. J. Northw. Atl. Fish. Sci. 5: 105-106.

GE1 Bowering, W. R., and D. E. Stansbury. 1984. Regressions of weight on length for Greenland halibut, Reinhardtius hippoglossoides, from Canadian waters of the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 5: 107-108.

G3 Brodie, W. B. 1984. American plaice in NAFO Subarea 2+Div. 3K - an assessment update. CAFSAC Res. Doc. 84/50. 9 p.

G3 Brodie, W. B. 1984. American plaice in NAFO Subdivision 3Ps - an assessment update. CAFSAC Res. Doc. 84/51. 7 p.

G3 Brodie, W. B., and T. K. Pitt. 1984. An assessment of American plaice in NAFO Divisions 3LNO. NAFO SCR Doc. 84/48, Ser. No. N834. 19 p.

G3 Brodie, W. B., and T. K. Pitt. 1984. Yellowtail flounder in Divisions 3LNO - an assessment update. NAFO SCR Doc. 84/49, Ser. No. N835. 13 p.

F1 Bruce, W. J. 1984. Potential fisheries yield from Smallwood Reservoir, western Labrador, with special emphasis on lake whitefish. N. Am. J. Fish. Manage. 4: 48-66.

P2 Carscadden, J. E. 1984. Capelin in the Northwest Atlantic, p. 170-183. In D. N. Nettleship, G. A. Sanger, and P. F. Springer [ed.] Marine birds: their feeding ecology and commercial fisheries relationships. Proceedings of the Pacific Seabird Group Symposium, Seattle, Washington, 6-8 January 1982.

P3 Carscadden, J. E. 1984. Population dynamics and factors affecting the abundance of capelin (Mallotus villosus) in the Northwest Atlantic, p. 789-811. In Proceedings of the Expert Consultation to Examine Changes in Abundance and Species Composition of Neritic Fish Resources, San José, Costa Rica, 18-29 April 1983. FAO Fisheries Report.

P3 Carscadden, J., B. S. Nakashima, and D. S. Miller. 1984. Observations on the capelin stock in Div. 2J3K. CAFSAC Res. Doc. 84/49. 42 p.

O3 *Carter, J.C.H., and W. D. Taylor. 1984. Multivariate analysis of midsummer zooplankton assemblages in lakes of Newfoundland. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). Waterloo Research Institute Report 310-13, April 1984. 14 p.

E1 Chart, H., D. H. Shaw, E. E. Ishiguro, and T. J. Trust. 1984. Structural and immunochemical homogeneity of Aeromonas salmonicida lipopolysaccharide. J. Bacteriol. 158: 16-22.

EF1 Chengalath, R., W. J. Bruce, and D. A. Scruton. 1984. Rotifer and crustacean plankton communities of lakes of insular Newfoundland. Verh. Int. Verein. Limnol. 22: 419-430.

04 Coady, L. W. 1984. Program review, evaluation and planning functions in fisheries research - a national review. 77 p. [report submitted to Fisheries Research Directorate, Department of Fisheries and Oceans, Ottawa].

03 Coady, L. W., and J. S. Scott. 1984. Canadian research report, 1983. NAFO SCS Doc. 84/15, Ser. No. N815. 15 p.

F1 Cone, D. K., and P. M. Ryan. 1984. Population sizes of metazoan parasites of brook trout (Salvelinus fontinalis) and Atlantic salmon (Salmo salar) in a small Newfoundland lake. Can. J. Zool. 62: 130-133.

P3 Dawe, E. G. 1984. Variation in length-weight relationships, condition, and feeding spectrum of short-finned squid (Illex illecebrosus) at Holyrood, Newfoundland. NAFO SCR Doc. 84/112, Ser. No. N909. 13 p.

P03 Dawe, E. G., M. C. Mercer, and W. Threlfall. 1984. On the stock identity of short-finned squid (Illex illecebrosus) in the Northwest Atlantic. NAFO Sci. Coun. Studies 7: 77-86.

P3 Dawe, E. G., R. K. O'Dor, P. H. Odense, and G. V. Hurley. 1984. Development of an ageing technique for the short-finned squid (Illex illecebrosus). NAFO SCR Doc. 84/110, Ser. No. N907. 24 p.

03 *DeGraaf, D. A., and G. J. Chaput. 1984. Instream flow incremental methodology: microhabitat utilization criteria for Atlantic salmon in Newfoundland waters. Report submitted to Department of Fisheries and Oceans by LGL Ltd., St. John's, Newfoundland. 63 p.

F3 Dempson, J. B. 1984. Conversion factors for northern Labrador Arctic charr landings statistics. CAFSAC Res. Doc. 84/6. 8 p.

F3 Dempson, J. B., and L. J. LeDrew. 1984. Assessment of Voisey Bay, Anaktalik Bay, and Okak Bay Arctic charr stocks in 1983 and projections for 1984. CAFSAC Res. Doc. 84/8. 14 p.

F3 Dempson, J. B., L. J. LeDrew, and G. Furey. 1984. Summary of catch statistics for the northern Labrador Arctic charr fishery in 1983. CAFSAC Res. Doc. 84/5. 20 p.

F3 Dempson, J. B., L. J. LeDrew, and R. A. Myers. 1984. Assessment of the Tikkoatokak - Nain Bay Arctic charr stock in 1983 and projections for 1984. CAFSAC Res. Doc. 84/4. 20 p.

F1 Dempson, J. B., and R. K. Misra. 1984. Identification of anadromous Arctic charr (Salvelinus alpinus) stocks in coastal areas of northern Labrador based on a multivariate statistical analysis of meristic data. Can. J. Zool. 62: 631-636.

E1 Dey, A. C. 1984. Distribution of malate dehydrogenase in different tissues of rainbow trout (Salmo gairdneri) of different ages. Comp. Biochem. Physiol. 77B: 675-678.

E4 Dey, A. C., and J. W. Kiceniuk. 1984. Gall bladder bile as a possible indicator of biochemical changes in fish livers due to exposure of fish to chronic low concentrations of crude oil compounds [Abstract]. I. Congress on Comparative Physiology and Biochemistry, Liege, Belgium, 1984, #C49.

P3 Drew, H. J., E. G. Dawe, and P. C. Beck. 1984. The 1983 fishery for short-finned squid (Illex illecebrosus) in the Newfoundland area. NAFO SCR Doc. 84/68, Ser. No. N857. 7 p.

03 *Earle, J. C., and H. C. Duthie. 1984. Multivariate statistical analysis of the phytoplankton of ninety-five Labrador lakes. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). Waterloo Research Institute Report 305-21, July 1984. 24 p.

03 *Earle, J. C., and H. C. Duthie. 1984. Multivariate statistical analysis of the phytoplankton of ninety-seven Newfoundland lakes. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). Waterloo Research Institute Report 305-21B, August 1984. 22 p.

P1 Ennis, G. P. 1984. Comparison of physiological and functional size-maturity relationships in two Newfoundland populations of Homarus americanus. Fish. Bull. 82: 237-242.

P1 Ennis, G. P. 1984. Tag-recapture validation of molt and egg extrusion predictions based upon pleopod examination in the American lobster, Homarus americanus. Fish. Bull. 82: 242-244.

P1 Ennis, G. P. 1984. Incidence of molting and spawning in the same season in female lobsters, Homarus americanus. Fish. Bull. 82(3) (in press).

P1 Ennis, G. P. 1984. Territorial behavior of the American lobster Homarus americanus. Trans. Am. Fish. Soc. 113: 330-335.

P1 Ennis, G. P. 1984. Small-scale seasonal movements of the American lobster Homarus americanus. Trans. Am. Fish. Soc. 113: 336-338.

EG1 Evans, G. T., J. C. Rice, and E.M.P. Chadwick. 1984. Patterns in growth and smolting of Atlantic salmon (Salmo salar) parr. Can. J. Fish. Aquat. Sci. 41: 783-797.

F1 Frenette, M., M. Caron, P. Julien, and R. J. Gibson. 1984. Interaction entre le débit et les populations de tacons (Salmo salar) de la rivière Matamec, Québec. Can. J. Fish. Aquat. Sci. 41: 954-963.

G3 Gavaris, S., and C. A. Bishop. 1984. Calculation of partial selection for cod in Subdivision 3Ps. NAFO SCR Doc. 84/50, Ser. No. N836. 7 p.

G3 Gavaris, S., C. A. Bishop, and J. W. Baird. 1984. Assessment of the cod stock in Divisions 2J+3KL. NAFO SCR Doc. 84/73, Ser. No. N862. 31 p.

G3 Gavaris, S., and W. B. Brodie. 1984. Results of comparative fishing between the A. T. CAMERON and the WILFRED TEMPLEMAN during July-August 1983. CAFSAC Res. Doc. 84/41. 16 p.

F4 Gibson, R. J. 1984. Trout spawning time. Evening Telegram, September 29, 1984.

F1 Gibson, R. J., and T. A. Dickson. 1984. The effects of competition on the growth of juvenile Atlantic salmon. Nat. Can. (Que.) 111: 175-191.

F1 Gibson, R. J., J-P. Thonney, and K. Hillier. 1984. An easterly extension in the known range for Fundulus diaphanus in Newfoundland. Nat. Can. (Que.) 111: 213-214.

O4 *Greening, D. 1984. User maintenance guide - program for distribution contouring routines adapted for the HP 1000. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 79 p.

P4 Hay, K. 1984. Hooded seals studied in Davis Strait. Nunatsiaq News, Frobisher Bay, N.W.T., September 7, 1984, p. 8.

P3 Hay, K. A. 1984. The life history of the narwhal (Monodon monoceros L.) in the eastern Canadian Arctic. Ph.D. thesis, McGill University, Montreal, P.Q. 255 p.

F2 Hunte, W., and R. A. Myers. 1984. Phototaxis and cannibalism in gammaridean amphipods. Mar. Biol. 81: 75-79.

G4 Khan, R. A., W. R. Bowering, C. Bourgeois, and H. Lear. 1984. Myxospora of marine fish from the continental shelf off Newfoundland-Labrador, Canada [Abstract], p. 61. In Program and Abstracts, 58th Annual Meeting, The American Society of Parasitologists, December 4-8, 1983, San Antonio, Texas.

G3 Kulka, D. W. 1984. Estimates of discarding by the Newfoundland offshore fleet in 1982. NAFO SCR Doc. 84/28, Ser. No. N809. 16 p.

G1 Kulka, D. W., and S. Corey. 1984. Incidence of parasitism and irregular development of gonads in Thysanoessa inermis (Krøyer) in the Bay of Fundy (Euphausiacea). Crustaceana (Leiden) 46: 87-94.

G1 Lear, W. H. 1984. Discrimination of the stock complex of Atlantic cod (Gadus morhua) off southern Labrador and eastern Newfoundland, as inferred from tagging studies. J. Northw. Atl. Fish. Sci. 5: 143-159.

G3 Lear, W. H. 1984. Results of tagging of adult Atlantic cod in inshore areas of Newfoundland and Labrador during 1979-1982. NAFO SCR Doc. 84/23, Ser. No. N798. 7 p.

G3 Lear, W. H. 1984. The winter distribution of cod in NAFO Divisions 2J, 3K, and 3L, based on research vessel catches during 1978-83. NAFO SCR Doc. 84/24, Ser. No. N799. 9 p.

G3 Lear, W. H. 1984. Results of tagging of Atlantic cod on St. Pierre Bank during February, 1980. NAFO SCR Doc. 84/25, Ser. No. N806. 4 p.

G3 Lear, W. H. 1984. Offshore and inshore catches of Atlantic cod in NAFO Divisions 2J, 3K, and 3L during 1958-83. NAFO SCR Doc. 84/26, Ser. No. N807. 8 p.

G4 Lear, W. H. 1984. Atlantic cod. Underwater World, DFO/1245, UW/38. 8 p.

G2 Lear, W. H., and J. M. Green. 1984. Migration of the "northern" Atlantic cod and the mechanisms involved, p. 309-315. In J. D. McCleave, G. P. Arnold, J. J. Dodson, and W. H. Neill [ed.] Mechanisms of migration in fishes. Plenum Publishing Corp., New York, NY.

G1 Lear, W. H., and R. Wells. 1984. Vertebral averages of juvenile cod, Gadus morhua, from coastal waters of eastern Newfoundland and Labrador as indicators of stock origin. J. Northw. Atl. Fish. Sci. 5: 23-31.

E4 Lee, Y. Z., P. J. O'Brien, J. F. Payne, and A. D. Rahimtula. 1984. Toxic and biochemical effects of petroleum crude oils on the avian embryo [Abstract]. Proceedings of the 6th International Symposium on Microsomes and Drug Oxidations, Brighton, United Kingdom, August 5-10, 1984.

P1 Leggett, W. C., K. T. Frank, and J. E. Carscadden. 1984. Meteorological and hydrographic regulation of year-class strength in capelin (Mallotus villosus). Can. J. Fish. Aquat. Sci. 41: 1193-1201.

G3 Lilly, G. R. 1984. Annual variability in the diet of Atlantic cod (Gadus morhua L.) off southern Labrador and northeast Newfoundland (Div. 2J+3K) in autumn, 1977-82. NAFO SCR Doc. 84/79, Ser. No. N868. 12 p.

G3 Lilly, G. R. 1984. Predation by Atlantic cod on shrimp and crabs off northeastern Newfoundland in autumn of 1977-82. ICES C.M.1984/G:53. 25 p.

G3 Lilly, G. R., M. A. Almeida, and W. H. Lear. 1984. Food of Atlantic cod (Gadus morhua) from southern Labrador and eastern Newfoundland (Div. 2J, 3K, and 3L) in winter. NAFO SCR Doc. 84/88, Ser. No. N878. 9 p.

G3 Lilly, G. R., and J. R. Botta. 1984. Food of Atlantic cod (Gadus morhua L.) near Bonavista, Newfoundland in 1983. NAFO SCR Doc. 84/51, Ser. No. N838. 8 p.

G3 Lilly, G. R., and D. R. Osborne. 1984. Predation by Atlantic cod (Gadus morhua) on short-finned squid (Illex illecebrosus) off eastern Newfoundland and in the northeastern Gulf of St. Lawrence. NAFO SCR Doc. 84/108, Ser. No. N905. 16 p.

E1 Lobel, P. B., and J. F. Payne. 1984. An evaluation of mercury-203 for assessing the induction of metallothionein-like proteins in mussels exposed to cadmium. Bull. Environ. Contam. Toxicol. 33: 144-152.

G4 McKone, W. D., and E. M. LeGrow. 1984. Redfish (ocean perch). Underwater World, DFO/1233, UW/33. 6 p.

O4 Mercer, M. C. 1984. Resource outlook for the Newfoundland fishery. Text of a presentation to the Seminar on Current Fisheries Issues, Marine '84, November 8, 1984, Gander, Newfoundland. 23 p.

E1 Michon, F., D. H. Shaw, and J. H. Banoub. 1984. Structure of the lipopolysaccharide core isolated from a human strain of Aeromonas hydrophila. Eur. J. Biochem. 145: 107-114.

P3 Miller, D. S. 1984. Capelin acoustic surveys in NAFO Divisions 3L and 3NO, 1983. NAFO SCR Doc. 84/56, Ser. No. N843. 7 p.

P3 Miller, D. S., and J. E. Carscadden. 1984. Capelin acoustic biomass survey for NAFO Division 2J3K, October 1983. CAFSAC Res. Doc. 84/79. 10 p.

PE3 Miller, D. S., and C. R. Stevens. 1984. Calibration of the time varied gain function in a hydroacoustic data collection system. ICES C.M.1984/B:24. 7 p.

G1 Misra, R. K., and W. R. Bowering. 1984. Stock delineation of Greenland halibut in the Northwest Atlantic using a recently developed, multivariate statistical analysis based on meristic characters. N. Am. J. Fish. Manage. 4A: 390-398.

P1 Misra, R. K., and J. E. Carscadden. 1984. Stock discrimination of capelin (Mallotus villosus) in the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 5: 199-205.

P1 Moores, J. A., and G. H. Winters. 1984. Migration patterns of Newfoundland west coast herring, Clupea harengus, as shown by tagging studies. J. Northw. Atl. Fish. Sci. 5: 17-22.

F3 Moores, R. B., and E.G.M. Ash. 1984. Angled catch and effort data for Atlantic salmon in Newfoundland and Labrador, and for other fishes in Labrador, 1981. Can. Data Rep. Fish. Aquat. Sci. 451: xv + 88 p.

F3 Moores, R. B., and E.G.M. Ash. 1984. Fishway and counting fence operations in Newfoundland and Labrador, 1949-79. Can. Data Rep. Fish. Aquat. Sci. 477: v + 123 p.

F3 Moores, R. B., A. W. Veitch, and E.G.M. Ash. 1984. Atlantic salmon commercial catch statistics, Newfoundland and Labrador, 1980 and 1981. Can. Data Rep. Fish. Aquat. Sci. 466: iv + 213 p.

F1 Myers, R. A. 1984. Demographic consequences of precocious maturation of Atlantic salmon (Salmo salar). Can. J. Fish. Aquat. Sci. 41: 1349-1353.

P3 Naidu, K. S. 1984. An analysis of the scallop meat count regulation. CAFSAC Res. Doc. 84/73. 18 p.

PE3 Naidu, K. S., and J. T. Anderson. 1984. Aspects of scallop recruitment on St. Pierre Bank in relation to oceanography and implications for resource management. CAFSAC Res. Doc. 84/29. 15 p.

P3 Naidu, K. S., and F. M. Cahill. 1984. Status and assessment of St. Pierre Bank scallop stocks, 1982-83. CAFSAC Res. Doc. 84/69. 56 p.

P3 Nakashima, B. S. 1984. Aerial photography of capelin (Mallotus villosus) schools in the coastal waters of Newfoundland, p. 655-660. In Renewable Resources Management: Applications of Remote Sensing. Proc. of the RNRF Symp. on the Application of Remote Sensing to Resource Management, Seattle, WA, May 22-27, 1983.

P3 Nakashima, B. S. 1984. Some results of the 1983 capelin tagging experiments in Conception Bay, Newfoundland. NAFO SCR Doc. 84/55, Ser. No. N842. 4 p.

P3 Nakashima, B. S. 1984. Collection and interpretation of catch and effort data from the Division 3L inshore capelin fishery. CAFSAC Res. Doc. 84/24. 17 p.

P3 Nakashima, B. S., and R. W. Harnum. 1984. The 1983 inshore capelin fishery in Div. 3L. NAFO SCR Doc. 84/54, Ser. No. N841. 7 p.

P1 Nakashima, B. S., and G. H. Winters. 1984. Selection of external tags for marking Atlantic herring (Clupea harengus harengus). Can. J. Fish. Aquat. Sci. 41: 1341-1348.

G1 Ni, I-H. 1984. Meristic variation in golden redfish, Sebastes marinus, compared to beaked redfishes of the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 5: 65-70.

G4 Ni, I-H. 1984. Reproductive biology of Northwest Atlantic redfishes [Abstract]. Proceedings Ann. Meeting Can. Conf. for Fish. Res., Ottawa, January 1984.

G3 Ni, I-H., and D. B. Atkinson. 1984. Assessment of the redfish stock in Subarea 2 and Div. 3K. CAFSAC Res. Doc. 84/33. 24 p.

G4 Ni, I-H., R. K. Misra, and D. J. Power. 1984. Morphometric classification of Northwest Atlantic redfishes (Sebastes) by discriminant analysis with covariance [Abstract]. Ann. Meeting Am. Soc. Ichthyologists and Herpetologists, Norman, Oklahoma, July 1983.

G1 Ni, I-H., and E. J. Sandeman. 1984. Size at maturity for Northwest Atlantic redfishes (Sebastes). Can. J. Fish. Aquat. Sci. 41: 1753-1762.

O3 *OceanChem Ltd. 1984. Analysis of chlorophyll and nutrients in water samples from the South-East Shoal, Grand Banks of Newfoundland. Data Report for WILFRED TEMPLEMAN #15, 1984 survey. Report submitted to Department of Fisheries and Oceans (Newfoundland Region). 24 p.

FP1 O'Connell, M. F., C. W. Andrews, J. P. O'Brien, and E. G. Dawe. 1984. Aspects of the ecology of the fishes of Holyrood Pond: a coastal lake with occasional access to the sea located in St. Mary's Bay, Newfoundland. Int. Rev. Gesamten Hydrobiol. 69: 333-360.

F3 O'Connell, M. F., E.G.M. Ash, and N. M. Caines. 1984. Factors affecting the expenditure of effort in the commercial Atlantic salmon (Salmo salar L.) fishery in Conception Bay, Newfoundland. ICES C.M.1984/M:14. 16 p.

F3 O'Connell, M. F., R. J. Gibson, and E.G.M. Ash. 1984. An assessment of Atlantic salmon stocks in Deadman's Brook, Anchor Brook, Tides Brook and Main River (Sop's Arm), Newfoundland. CAFSAC Res. Doc. 84/7. 23 p.

P3 Parsons, D. G. 1984. Estimation of abundance of shrimp (Pandalus borealis) from stratified random surveys - problems of variation in distribution and availability. CAFSAC Res. Doc. 84/26. 18 p.

P4 Parsons, D. G. 1984. The northern shrimp. Underwater World, DFO/1301, UW/32. 6 p.

P3 Parsons, D. G., and G. E. Tucker. 1984. Observations on some biological characteristics of shrimp (Pandalus borealis) from the Davis Strait, 1978-81. NAFO SCR Doc. 84/4, Ser. No. N773. 18 p.

P3 Parsons, D. G., and G. E. Tucker. 1984. A review of shrimp (Pandalus borealis) biology and environmental changes in the Cartwright Channel (Division 2J), 1977-83. CAFSAC Res. Doc. 84/22. 25 p.

P3 Parsons, D. G., and P. J. Veitch. 1984. The fishery for shrimp (Pandalus borealis) and status of the stock in the Hopedale Channel (Div. 2H), 1983. CAFSAC Res. Doc. 84/21. 28 p.

P3 Parsons, D. G., P. J. Veitch, and G. E. Tucker. 1984. Details of catch, effort and CPUE from the Canadian fishery for shrimp (Pandalus borealis) in Division 0A, 1983. NAFO SCR Doc. 84/3, Ser. No. N772. 14 p.

E3 Payne, J. F. 1984. Chronic environmental toxicity of oil-based drilling muds, p. 54-57. In Report of the Workshop on Environmental Considerations in the Offshore Use of Oil-based Drilling Muds, May 23-24, 1984, Ottawa.

E1 Payne, J. F., C. Bauld, A. C. Day, J. W. Kiceniuk, and U. Williams. 1984. Selectivity of mixed function oxygenase enzyme induction in flounder (Pseudopleuronectes americanus) collected at the site of the Baie Verte, Newfoundland, oil spill. Comp. Biochem. Physiol. 79C: 15-19.

E4 Payne, J. F., C. Bauld, A. Day, J. Kiceniuk, and U. Williams. 1984. Mixed function oxygenase enzyme induction in the environment: observations at an oil spill in Newfoundland [Abstract]. Can. Fed. Biol. Soc., Saskatoon, 1984, Vol. 27, PA23.

E4 Payne, J. F., J. Kiceniuk, R. Misra, G. Fletcher, and R. Thompson. 1984. Quest for facile biological monitoring indices in invertebrates: effect of chronic exposure to petroleum hydrocarbons on lobsters [Abstract]. Mar. Environ. Res. 14: 493-494.

E3 Payne, J. F., J. Osborne, and B. Moores. 1984. Preliminary studies on the chronic toxic effects of cuttings contaminated with oil-based drilling muds, p. 58-60. In Report of the Workshop on Environmental Considerations in the Offshore Use of Oil-based Drilling Muds, May 23-24, 1984, Ottawa.

E2 Payne, J. F., and A. Rahimtula. 1984. A perspective on potential environmental problems associated with chlorine usage, p. 94-108. In R.C.H. Wilson and R. F. Addison [ed.] Health of the Northwest Atlantic. Department of the Environment/Department of Fisheries and Oceans/Department of Energy, Mines and Resources.

E4 Payne, J. F., A. D. Rahimtula, and P. Eaton. 1984. Mutagens in aquatic environments: the potential of a variety of priority contaminants [Abstract]. Mar. Environ. Res. 14: 511-512.

E3 Penney, R. 1984. Comparative morphology of pre-extrusion larvae of the sharp-beaked redfishes, Sebastes mentella and S. fasciatus. NAFO SCR Doc. 84/84, Ser. No. N874. 14 p.

E3 Penney, R. W. 1984. Age, growth and morphology of larval redfish, Sebastes spp. (Pisces: Scorpaenidae) on Flemish Cap, 1980-1981. M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld. 179 p.

EG3 Penney, R. W., D. J. Power, and D. B. Atkinson. 1984. Species proportions and some reproductive aspects of three redfish species (Sebastes marinus, S. fasciatus, and S. mentella) on Flemish Cap, March 1983. NAFO SCR Doc. 84/22, Ser. No. N797. 9 p.

F2 Pepper, V. A. 1984. Deep-substrate incubators - a field guide for Atlantic salmon enhancement. Can. Spec. Publ. Fish. Aquat. Sci. 71: 25 p.

F3 Pepper, V. A., N. P. Oliver, and R. Blundon. 1984. Lake surveys and biological potential for natural lacustrine rearing of juvenile Atlantic salmon (Salmo salar) in Newfoundland. Can. Tech. Rep. Fish. Aquat. Sci. 1295: iv + 72 p.

F2 Platt, J. F., and D. G. Reddin. 1984. Recent trends in the West Greenland salmon fishery, and implications for thick-billed murres, p. 208-210. In D. N. Nettleship, G. A. Sanger, and P. F. Springer [ed.] Marine birds: their feeding ecology and commercial fisheries relationships. Proceedings of the Pacific Seabird Group Symposium, Seattle, Washington, 6-8 January 1982.

G1 Pinhorn, A. T. 1984. Inshore exploitation of Atlantic cod, Gadus morhua, in Labrador and eastern Newfoundland waters. J. Northw. Atl. Fish. Sci. 5: 79-84.

G1 Pinhorn, A. T. 1984. Temporal and spatial variation in fecundity of Atlantic cod (Gadus morhua) in Newfoundland waters. J. Northw. Atl. Fish. Sci. 5: 161-170.

G4 Pinhorn, A. T. 1984. Obituary: Allister M. Fleming. J. Northw. Atl. Fish. Sci. 5: 219-220.

G3 Pinhorn, A. T., and R. G. Halliday. 1984. A framework for identifying fisheries management problems associated with the influence of environmental factors on the distribution, movements and migration of marine species. NAFO SCR Doc. 84/72, Ser. No. N861. 12 p.

F3 Pippy, J.H.C. 1984. Activity report of the Anadromous and Catadromous Fish Committee. ICES C.M.1984/M:1 (with appendix). 69 p.

G4 Pitt, T. K. 1984. Yellowtail flounder. Underwater World, DFO/1494, UW/020E. 6 p.

G4 Pitt, T. K. 1984. Winter flounder. Underwater World, DFO/1248, UW/34. 3 p.

F3 Porter, T. R., and J. A. Ritter. 1984. Possible causes of low abundance of Atlantic salmon in Canada - 1983. ICES C.M.1984/M:28. 27 p.

E2 Rahimtula, A. D., P.J. O'Brien, and J. F. Payne. 1984. Induction of xenobiotic metabolism in rats on exposure to hydrocarbon-based oils, p. 71-80. In M. A. Mehlman, H. N. MacFarland, C. E. Cali, and M. L. Kane (ed.) Advances in Modern Environmental Toxicology: Applied Toxicology of Petroleum Hydrocarbons. Princeton Scientific Publishers, Princeton, New Jersey. (also p. 115-121, Proc. Symp. The Toxicology of Petroleum Hydrocarbons, Wash., D.C., May 1982).

F3 Reddin, D. G. 1984. Results of Atlantic salmon tagging study in Miramichi Bay, New Brunswick. Can. Tech. Rep. Fish. Aquat. Sci. 1301: iv + 22 p.

F3 Reddin, D. G. 1984. Relationship between West Greenland and Canadian 1-sea-winter salmon catches. CAFSAC Res. Doc. 84/39. 11 p.

F3 Reddin, D. G., and R. F. Burfitt. 1984. A new feeding area for Atlantic salmon (Salmo salar L.) to the east of the Newfoundland continental shelf. ICES C.M.1984/M:13. 14 p.

F3 Reddin, D. G., R. F. Burfitt, and P. B. Short. 1984. Identification of North American and European Atlantic salmon (Salmo salar L.) caught off West Greenland in 1982-83. ICES C.M.1984/M:12. 18 p.

FG3 Reddin, D. G., and W. H. Lear. 1984. Seasonal trends in the biological characteristics of Atlantic salmon (Salmo salar L.) catches in the 1974-76 commercial fishery at Portugal Cove, Newfoundland. Can. Tech. Rep. Fish. Aquat. Sci. 1323: iv + 88 p.

F3 Reddin, D. G., W. M. Shearer, and R. F. Burfitt. 1984. Inter-continental migrations of Atlantic salmon (Salmo salar L.). ICES C.M.1984/M:11. 9 p.

G1 Rice, J. C., R. D. Ohmart, and B. W. Anderson. 1984. Comparison of the importance of different habitat attributes to avian community organization. J. Wildl. Manage. 48: 895-911.

P3 Rowell, T. W., R. W. Trites, and E. G. Dawe. 1984. Larval and juvenile distribution of the short-finned squid (Illex illecebrosus) in relation to the Gulf Stream Frontal Zone in the Blake Plateau and Cape Hatteras area. NAFO SCR Doc. 84/111, Ser. No. N908. 37 p.

F1 Ryan, P. M. 1984. Variation in abundance and diversity of crustacean zooplankton in two small, shallow lakes in central Newfoundland, Canada. Verh. Int. Verein. Limnol. 22: 412-418.

F1 Ryan, P. M. 1984. Fyke net catches as indices of the abundance of brook trout, Salvelinus fontinalis, and Atlantic salmon, Salmo salar. Can. J. Fish. Aquat. Sci. 41: 377-380.

F3 Ryan, P. M. 1984. Age, growth and food of threespine sticklebacks (Gasterosteus aculeatus) in three lakes of central Newfoundland, Canada. Can. Tech. Rep. Fish. Aquat. Sci. 1325: iv + 16 p.

F3 Ryan, P. M., and D. Wakeham. 1984. An overview of the physical and chemical limnology of the Experimental Ponds Area, central Newfoundland, 1977-82. Can. Tech. Rep. Fish. Aquat. Sci. 1320: v + 54 p.

E3 Scruton, D. A. 1984. A compilation of water quality data for Newfoundland and Labrador for the years 1972-80. Can. Data Rep. Fish. Aquat. Sci. 441: 288 p.

E3 Scruton, D. A. 1984. A survey of selected lakes in Labrador, with an assessment of lake status and sensitivity in relation to acid precipitation. Can. Tech. Rep. Fish. Aquat. Sci. 1296: v + 115 p.

E3 Scruton, D. A. 1984. DFO's national inventory program and results of lake surveys conducted in the Newfoundland Region. A review prepared for the Royal Society of Canada, Toronto, Ontario, February 21-23, 1984. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 16 p.

E3 Scruton, D. A. 1984. The potential for acidification of Newfoundland and Labrador fresh waters and implications for resident fish: a summary of Fisheries and Oceans research activities in the Newfoundland Region, 1981 to 1984. A brief prepared for the Parliamentary Sub-Committee on Acid Rain of the Standing Committee on Fisheries and Forestry, St. John's, Newfoundland, April 13, 1984. Fisheries Research Branch, Department of Fisheries and Oceans, St. John's, Newfoundland. 26 p.

E1 Shaw, D. H., and M. J. Squires. 1984. O-antigen structure in a virulent strain of Aeromonas hydrophila. FEMS (Fed. Eur. Microbiol. Soc.) Microbiol. Lett. 24: 277-280.

E4 Shaw, D. H., and M. J. Squires. 1984. Report on the vaccination of rainbow trout at Hopeall, Trinity Bay. Report to the Upper Trinity South Development Association. 7 p.

G3 Stevenson, S. C., A. D. Murphy, and R. B. Stead. 1984. Report on the cod by-catch in the 1981-83 Newfoundland capelin trap fisheries. Can. Tech. Rep. Fish. Aquat. Sci. 1310: iv + 15 p.

P3 Taylor, D. M. 1984. A biological perspective - Newfoundland crab fishery, 17 p. In Record of Proceedings, Snow Crab Seminar, Gander, Newfoundland, January 24-27, 1984. Department of Fisheries and Oceans, Newfoundland Region.

P3 Taylor, D. M., R. G. Hooper, and G. P. Ennis. 1984. Biological aspects of the spring breeding migration of snow crabs (Chionoecetes opilio) in Bonne Bay, Newfoundland (Canada). CAFSAC Res. Doc. 84/58. 11 p.

P3 Taylor, D. M., and P. G. O'Keefe. 1984. Assessment of snow crab (Chionoecetes opilio) stocks in Newfoundland for 1981. CAFSAC Res. Doc. 84/3. 30 p.

P3 Taylor, D. M., and P. G. O'Keefe. 1984. Assessment of Newfoundland snow crab (Chionoecetes opilio) stocks, 1982. CAFSAC Res. Doc. 84/13. 35 p.

O1 *Templeman, W. 1984. Migrations of spiny dogfish, Squalus acanthias, and recapture success from tagging in the Newfoundland area, 1963-65. J. Northw. Atl. Fish. Sci. 5: 47-53.

O1 *Templeman, W. 1984. Migrations of thorny skate, Raja radiata, tagged in the Newfoundland area. J. Northw. Atl. Fish. Sci. 5: 55-63.

O1 *Templeman, W. 1984. Migrations of wolffishes, Anarhichas sp., from tagging in the Newfoundland area. J. Northw. Atl. Fish. Sci. 5: 93-97.

O1 *Templeman, W. 1984. Variations in numbers of median dorsal thorns and rows of teeth in thorny skate (Raja radiata) of the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 5: 171-179.

O1 *Templeman, W. 1984. Vertebral and dorsal fin-ray numbers in Atlantic wolffish (Anarhichas lupus) of the Northwest Atlantic. J. Northw. Atl. Fish. Sci. 5: 207-212.

O3 *Templeman, W. 1984. Stomach contents of the Atlantic wolffish, Anarhichas lupus, from the Northwest Atlantic. NAFO SCR Doc. 84/12, Ser. No. N785. 6 p.

E2 Tremblay, M. J., and J. T. Anderson. 1984. Annotated species list of marine planktonic copepods occurring on the shelf and upper slope of the Northwest Atlantic (Gulf of Maine to Ungava Bay). Can. Spec. Publ. Fish. Aquat. Sci. 69: 16 p.

G1 Walsh, S. J. 1984. Relative efficiency of two bottom trawls in catching juvenile and commercial-sized flatfishes in the Gulf of St. Lawrence. J. Northw. Atl. Fish. Sci. 5: 181-188.

G3 Wells, R. 1984. Maximum age of cod in Subareas 2 and 3 with comment on natural mortality-at-age. NAFO SCR Doc. 84/46, Ser. No. N832. 4 p.

G3 Wells, R. 1984. Growth of cod in Divisions 2J, 3K and 3L, 1971-83. NAFO SCR Doc. 84/90, Ser. No. N881. 6 p.

G3 Wells, R., M. F. Borges, and A. Vazquez. 1984. Status of the cod stock in Division 3M. NAFO SCR Doc. 84/94, Ser. No. N889. 8 p.

G3 Wells, R., and S. Gavaris. 1984. Status of the cod stock in NAFO Division 3M. NAFO SCR Doc. 84/47, Ser. No. N833. 4 p.

P3 Wheeler, J. P. 1984. Problems in the collection of catch and effort data from the Newfoundland fixed gear herring fishery - a biologist's perspective. CAFSAC Res. Doc. 84/30. 11 p.

P3 Wheeler, J. P., R. Chaulk, and G. H. Winters. 1984. East coast Newfoundland herring - 1983 assessment. CAFSAC Res. Doc. 84/48. 59 p.

P3 Wheeler, J. P., and E. L. Dalley. 1984. Southwest Newfoundland herring - 1983 assessment. CAFSAC Res. Doc. 84/91. 45 p.

P1 Wheeler, J. P., and G. H. Winters. 1984. Homing of Atlantic herring (Clupea harengus harengus) in Newfoundland waters as indicated by tagging data. Can. J. Fish. Aquat. Sci. 41: 108-117.

P1 Wheeler, J. P., and G. H. Winters. 1984. Migrations and stock relationships of east and southeast Newfoundland herring (Clupea harengus) as shown by tagging studies. J. Northw. Atl. Fish. Sci. 5: 121-129.

P3 Wheeler, J. P., and G. H. Winters. 1984. Summary of herring tagging experiments conducted along the east and southeast coasts of Newfoundland, 1974-81. Can. Data Rep. Fish. Aquat. Sci. 439: iv + 22 p.

Appendix 2. Publications of the Newfoundland Technological Unit, 1960-70 (i.e. prior to joining Fisheries Research Branch).

## PUBLICATIONS - 1960

MacCallum, W. A. 1960. The fish room: engineering and architecture, p. 208-226. In J.-O. Traung [ed.] Fishing Boats of the World: 2. Fishing News (Books) Ltd., London.

## PUBLICATIONS - 1961

MacCallum, W. A. 1961. Changes associated with the post-mortem handling of tag-caught cod and experimentation in making new products from cod. Report No. 1, Contributions to the Inshore Cod Program [internal report].

MacCallum, W. A. 1961. A report on the Newfoundland Technological Unit's freeze-thaw-refreeze program. Report No. 2, Contributions to the Inshore Cod Program [internal report]. 14 p.

MacCallum, W. A., and M. S. Chan. 1961. Experiments on the storage of Canadian Atlantic coast cod in refrigerated sea water, Appendix 1. Bull. Fish. Res. Board Can. 126: 41-58.

## PUBLICATIONS - 1962

Dyer, W. J., D. I. Fraser, D. G. Ellis, D. R. Idler, W. A. MacCallum, and E. J. Laishley. 1962. Quality changes in stored refrozen cod fillets. Suppl. au Bull. Inst. Int. Froid, An., 1962-1: 515-524.

## PUBLICATIONS - 1963

Ackman, R. G., P. M. Jangaard, R. D. Burgher, M. L. Hughes, and W. A. MacCallum. 1963. Observations on the oil and component fatty acids of the oil from Newfoundland capelin. J. Fish. Res. Board Can. 20: 591-596.

MacCallum, W. A., and D. G. Ellis. 1963. Water thawing of frozen blocks of eviscerated, headed cod. Can. Fisherman 50(12): 61-66.

MacCallum, W. A., M. W. Mullan, and I. N. Plaunt. 1963. Factors influencing the effectiveness of fresh fish washing operations. J. Fish. Res. Board Can. 20: 1231-1244.

## PUBLICATIONS - 1964

MacCallum, W. A. 1964. Temperatures and thaw drip associated with electronic thawing of Newfoundland cod. J. Fish. Res. Board Can. 21: 719-726.

MacCallum, W. A., D. A. Chalker, J. T. Lauder, P. H. Odense, and D. R. Idler. 1964. Polyphosphate treatment of frozen cod. 3. Taste panel evaluation, chemical assessment, and thaw drip in once-frozen Newfoundland trap-caught cod. J. Fish. Res. Board Can. 21: 1397-1402.

MacCallum, W. A., and D. G. Ellis. 1964. Water thawing of frozen cod blocks. J. Fish. Res. Board Can. 21: 115-131.

MacCallum, W. A., and D. G. Ellis. 1964. Water thawing of block frozen, gutted cod. Fish. News Int. 3(1): 56-57.

MacCallum, W. A., and D. G. Ellis. 1964. Thawing cod in water. World Fishing 13(2): 56-59.

MacCallum, W. A., H. S. Shieh, D. A. Chalker, W. J. Dyer, and D. R. Idler. 1964. Polyphosphate treatment of frozen cod. 2. Effect on drip, yield, lipid hydrolysis and protein extractability in twice-frozen Newfoundland summer trap and fall cod. J. Fish. Res. Board Can. 21: 539-548.

## PUBLICATIONS - 1965

Chaiker, D. A., W. A. MacCallum, D. R. Idler. 1965. Studies on the quality of Newfoundland cod. 11. Thaw-drip in polyphosphate-treated and untreated fillets. J. Fish. Res. Board Can. 22: 783-791.

Idler, D. R., W. A. MacCallum, D. A. Chaiker, and J. T. Lauder. 1965. Effect of environmental and/or physiological factors on quality. Part 1. Newfoundland trap cod, p. 98-101. In R. Kreuzer [ed.] The Technology of Fish Utilization. Fishing News (Books) Ltd., London [also Paper No. WP/11/2, FAO Symposium on the Significance of Fundamental Research in the Utilization of Fish, 1964.]

MacCallum, W. A., D. A. Chaiker, E. J. Laishley, W. J. Dyer, and D. R. Idler. 1965. Studies on the quality of Newfoundland cod. 10. Effect of some commercial freezing rates on the frozen and stored quality of trap cod. J. Fish. Res. Board Can. 22: 411-420.

Slavin, J. W., and W. A. MacCallum. 1965. North American experience in chilling and freezing on board vessels, p. 931-941. In Proceedings XIth International Congress of Refrigeration, Munich, 1963. Volume II. Pergamon Press (1965) [also Fishing Gazette 81(13): 96, 98-103, 1964].

## PUBLICATIONS - 1966

MacCallum, W. A. 1966. Holds, storages, facilities and equipment for handling iced and frozen fish on Canadian trawlers, p. 369-381. In E. J. Kinloch [ed.] Proceedings Canadian Atlantic Offshore Fishing Vessel Conference, Montreal, February 7-9, 1966. Queen's Printer, Ottawa.

MacCallum, W. A., E. J. Laishley, W. J. Dyer, and D. R. Idler. 1966. Taste panel assessment of cod fillets after single and double freezing. J. Fish. Res. Board Can. 23: 1063-1081.

## PUBLICATIONS - 1967

MacCallum, W. A., D. A. Chaiker, W. J. Dyer, and D. R. Idler. 1967. Effects of water and dielectric thawing processes on shelf life of double-frozen cod and redfish. J. Fish. Res. Board Can. 24: 127-144.

MacCallum, W. A., J. I. Jaffray, D. N. Churchill, D. R. Idler, and P. H. Odense. 1967. Postmortem physicochemical changes in unfrozen Newfoundland trap-caught cod. J. Fish. Res. Board Can. 24: 651-678.

## PUBLICATIONS - 1968

Adams, G. A., M. Kates, D. H. Shaw, and M. Yaguchi. 1968. Studies on the chemical constitution of cell-wall lipopolysaccharides from Neisseria perflava. Can. J. Biochem. 46: 1175.

MacCallum, W. A., J. I. Jaffray, D. N. Churchill, and D. R. Idler. 1968. Condition of Newfoundland trap-caught cod and its influence on quality after single and double freezing. J. Fish. Res. Board Can. 25: 733-755.

Peters, J. A., W. A. MacCallum, W. J. Dyer, D. R. Idler, J. W. Slavin, J. P. Lane, D. I. Fraser, and E. J. Laishley. 1968. Effect of stage of rigor and of freeze-thawing process on storage quality of refrozen cod. J. Fish. Res. Board Can. 25: 299-320.

## PUBLICATIONS - 1969

Ackman, R. G., P. J. Ke, W. A. MacCallum, and D. R. Adams. 1969. Newfoundland capelin lipids: fatty acid composition and alterations during frozen storage. J. Fish. Res. Board Can. 26: 2037-2060.

Etchegary, A. A., J. S. Crewe, and W. A. MacCallum. 1969. Canadian experience in handling fish aboard chill-freezer trawlers. Commission VIII, Le Havre, 1969. Annexe 1969-5. International Institute of Refrigeration, p. 111-117.

Hayward, M. J., and W. A. MacCallum. 1969. Bacteria counts on cod and flounder fillets produced commercially from fish frozen at sea and thawed in water. J. Fish. Res. Board Can. 26: 3217-3231.

MacCallum, W. A., D. R. Adams, R. G. Ackman, P. J. Ke, W. J. Dyer, D. I. Fraser, and S. Punjamapirom. 1969. Newfoundland capelin: proximate composition. J. Fish. Res. Board Can. 26: 2027-2035.

MacCallum, W. A., and D. R. Idler. 1969. Influence of thawing and thawing methods on the immediate and refrozen storage quality of fish, p. 213-223. In R. Kreuzer [ed.] Freezing and irradiation of fish. Fishing News (Books) Ltd., London.

MacCallum, W. A., J. I. Jaffray, D. A. Chaiker, and D. R. Idler. 1969. Condition of Newfoundland offshore fish and its influence on quality after single and double freezing, p. 56-63. In R. Kruezer [ed.] Freezing and irradiation of fish. Fishing News (Books) Ltd., London.

MacCallum, W. A., and J. H. Merritt. 1969. The handling of sea-frozen whole fish and its effect on bacterial spoilage and on sanitary quality. Commission VIII, Le Havre, 1969. Annexe 1969-5. International Institute of Refrigeration, p. 119-123.

MacCallum, W. A., and K. Sepic. 1969. Commercial aspects of reprocessing and marketing sea frozen fish, p. 240-251. In R. Kreuzer [ed.] Freezing and irradiation of fish. Fishing News (Books) Ltd., London.

Perry, M. B., G. A. Adams, and D. H. Shaw. 1969. Gas liquid chromatographic separation of heptono-1, 4-lactones as trimethylsilyl derivatives. J. Chromatogr. 44: 614-616.

Sepic, K., and W. A. MacCallum. 1969. Heading and gutting of capelin with special hand shears. J. Fish. Res. Board Can. 26: 2257-2259.

Shaw, D. H., and G. W. Moss. 1969. Quantitative estimation of neutral sugars by gas-liquid chromatography. J. Chromatogr. 41: 350-357.

## PUBLICATIONS - 1970

Hayward, M. J., W. A. MacCallum, and D. H. Shaw. 1970. Bacteriological evaluation of flounder (Hippoglossoides platessoides) frozen at sea and thawed by water immersion. J. Fish. Res. Board Can. 27: 1985-1986.

Lauder, J. T., W. A. MacCallum, and D. R. Idler. 1970. Keeping time of frozen redfish (Sebastes marinus mentella) fillets in relation to handling of the raw material and storage temperatures after processing and freezing. J. Fish. Res. Board Can. 27: 1589-1605.

MacCallum, W. A., and D. R. Idler. 1970. A technical-economic assessment of electronically-powered and water immersion thawers used for processing fish blocks landed by Newfoundland trawlers. Proceedings Conference on Automation and Mechanization in the Fishing Industry, Montreal, February 3-6, 1970. Can. Fish. Rep. 15: 385-394.

MacCallum, W. A., and D. R. Idler. 1970. A technical-economic assessment of vertically-integrated fishing and filleting operations dependent on supplies of frozen and iced fish or on iced fish only. Proceedings Conference on Automation and Mechanization in the Fishing Industry, Montreal, February 3-6, 1970. Can. Fish. Rep. 15: 593-606.

Appendix 3. Publications of the Resource Development Branch, 1954-75 (i.e. prior to joining Fisheries Research Branch).

Legend

* - non-DFO authors

PUBLICATIONS - 1953

*Sollows, G. C., J. A. Dalziel, J. E. Cheeseman, G. H. Huxter, and H.V.E. Smith. 1953. Salmon investigations - 1953 preliminary survey of the rivers and commercial fishery of southern Labrador. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 1: 53 p.

PUBLICATIONS - 1954

*Sollows, G. C., J. A. Dalziel, G. Smith, and N. Steele. 1954. Salmon investigations - 1954 preliminary survey of the rivers and commercial fishery of northern Labrador. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 2: 22 p.

PUBLICATIONS - 1955

NIL

PUBLICATIONS - 1956

Taylor, V. R. 1956. The Rattling Brook power development and maintenance of the salmon run. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 3: 23 p.

PUBLICATIONS - 1957

Anon. 1957. [Edited by V. R. Taylor] Salmon Management Program - 1957. Fish Culture Development Branch, St. John's, Nfld. 11 p.

Anon. 1957. Counting fence and counting trap data - 1955-1956. Fish Culture Development Branch, St. John's, Nfld. 45 p.

PUBLICATIONS - 1958

Anon. 1958. Counting fence and counting trap data - 1957. Fish Culture Development Branch, St. John's, Nfld. 19 p.

PUBLICATIONS - 1959

Anon. 1959. [Edited by V. R. Taylor] Salmon and Trout Management Program - 1958. Fish Culture Development Branch, St. John's, Nfld. 14 p.

Anon. 1959. Counting fence and counting trap data - 1958. Fish Culture Development Branch, St. John's, Nfld. 21 p.

Mercer, K. M. 1959. The Rattling Brook adult salmon transfer project - 1956-1958. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 5: 42 p.

O'Reilly, F. L. 1959. A preliminary report on the Exploits River. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 4: 91 p.

Taylor, V. R. 1959. A preliminary report on the proposed Middle Brook hydro-development. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 6: 15 p.

PUBLICATIONS - 1960

Anon. 1960. [Edited by V. R. Taylor] Salmon and Trout Management Program - 1959. Fish Culture Development Branch, St. John's, Nfld. 11 p.

Anon. 1960. Counting fence and counting trap data - 1959. Fish Culture Development Branch, St. John's, Nfld. 33 p.

Seabrook, W. 1960. A preliminary study of salmon redds in S.E. Placentia River. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 67: 8 p.

PUBLICATIONS - 1961

Anon. 1961. [Edited by V. R. Taylor] Salmon and Trout Management Program - 1960. Fish Culture Development Branch, St. John's, Nfld. 47 p.

Anon. 1961. Counting fence and counting trap data - 1960. Fish Culture Development Branch, St. John's, Nfld. 31 p.

Ducharme, L.J.A. 1961. Age and size distribution of the spawning escapement of Atlantic salmon to three Newfoundland streams. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 8: 35 p.

Mercer, K. M. 1961. Report on a reconnaissance survey of Salmon, Grey, and Conne Rivers. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 9: 144 p.

Seabrook, W. D. 1961. A preliminary report on the biology of the non-migratory Arctic char (Salvelinus alpinus) of Butts Pond, Gambo. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 10: 43 p.

Taylor, V. R. 1961. Exploits River investigations - Bishop's Falls tagging project, 1959. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 11: 34 p.

PUBLICATIONS - 1962

Anon. 1962. [Edited by V. R. Taylor] Salmon and Trout Management Program - 1961. Fish Culture Development Branch, St. John's, Nfld. 48 p.

Anon. 1962. Counting fence and counting trap data - 1961. Fish Culture Development Branch, St. John's, Nfld. 29 p.

Anon. 1962. Summary of stream obstructions. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 13: 31 p.

Cowley, L. J. 1962. Exploits River investigations - 1961 pollution survey. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 14: 51 p.

Ducharme, L.J.A. 1962. Rattling Brook salmon transfer project - 1961. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 15: 31 p.

Mercer, K. M. 1962. Report on a reconnaissance survey of nine important streams on the Great Northern Peninsula. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 16: 111 p.

Seabrook, W. D. 1962. A survey of nine lakes on the Island of Newfoundland - 1961. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 23: 70 p.

PUBLICATIONS - 1963

Anon. 1963. [Edited by V. R. Taylor] Salmon and Trout Management Program - 1962. Fish Culture Development Branch, St. John's, Nfld. 31 p.

Anon. 1963. Counting fence and counting trap data - 1962. Fish Culture Development Branch, St. John's, Nfld. 20 p.

Cowley, L. J. 1963. Exploits River investigations - 1962 - pollution surveys Red Indian Lake and Exploits River. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 75: 43 p.

Mercer, K. M. 1963. Report on a survey of Come By Chance and North Harbour River. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 17: 28 p.

Pratt, J. D. 1963. Rattling Brook salmon transfer project smolt enumeration - 1962. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 18: 33 p.

PUBLICATIONS - 1964

Anon. 1964. (Edited by V. R. Taylor). Salmon and Trout Management Program - 1963. Fish Culture Development Branch, St. John's, Nfld: 42 p.

Anon. 1964. Counting fence and counting trap data - 1963. Fish Culture Development Branch, St. John's, Nfld. 26 p.

Cowley, L. J. 1964. Exploits River investigations - 1960 tagging program - Bishop's Falls. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 20: 80 p.

Mercer, K. M. 1964. A preliminary survey of Cupids, Long Pond (including adjacent ponds). Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 21: 23 p.

Parkinson, J. P., and B. R. Bauld. 1964. Design and construction of artificial spawning channels. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 19: 27 p.

Pratt, J. D. 1964. A controlled flow spawning channel for Atlantic salmon, Indian River, Newfoundland - general description and first year of operation, 1963-1964. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 22: 75 p.

Taylor, V. R. 1964. A retractable transducer for small boat echo sounding. Can. Fish. Cult. 32: 45-51 (also Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 24).

Taylor, V. R. 1964. Foreword, p. 1-8. In W. B. Scott and E. J. Crossman [ed.] Fishes occurring in the fresh waters of insular Newfoundland. Queen's Printer, Ottawa [also Contr. No. 58 of Life Sciences, Roy. Ont. Museum, Univ. Toronto].

Tulk, E. L. 1964. Reconnaissance survey report of Terra Nova River and associated tributaries. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 25: 24 p.

PUBLICATIONS - 1965

*Aldrich, F. A. 1965. Investigations on oysters, Crassostrea virginica (Gmelin), planted at Broad Lake, Bellevue, Trinity Bay. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 26: 53 p.

Anon. 1965. [Edited by V. R. Taylor]. Report of Fish Culture Development Branch (Newfoundland Area) for 1964. Fish Culture Development Branch, St. John's, Nfld. 53 p.

Anon. 1965. Counting fence and counting trap data - 1955-1964. Fish Culture Development Branch, St. John's, Nfld. 26 p.

*Leggett, W. C. 1965. The effect of environment on the food, growth, reproduction, and survival of ouananiche in eastern Canada. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 27: 87 p.

Pippy, J.H.C. 1965. A preliminary study on the systematic status of the Arctic char (Salvelinus alpinus) in Newfoundland. Resource Development Service, St. John's, Nfld., Progress Rep. 28: 17 p.

Pratt, J. D., and C. C. Sturge. 1965. Indian River studies, 1964-1965. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 29: 141 p.

Riche, L. G. 1965. A preliminary biological survey of the Naskaupi, Kanamu, and Lower Churchill Rivers. Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 30: 83 p.

Taylor, V. R. 1965. The fishery resource and hydro electric development in the province of Newfoundland and Labrador. Resource Development Service, St. John's, Nfld., Progress Rep. 31: 14 p.

Taylor, V. R. 1965. Water pollution and fish populations in the Province of Newfoundland and Labrador in 1964. Can. Fish. Cult. 35: 3-15 [also Fish Culture Development Branch, St. John's, Nfld., Progress Rep. 32].

PUBLICATIONS - 1966

Anon. 1966. [Edited by V. R. Taylor] Report of Resource Development Service (Newfoundland Area) for 1965. Resource Development Service, St. John's, Nfld. 60 p.

Harmon, T. J. 1966. A proposal for the integrated development of the Black and Come By Chance river basins. Resource Development Service, St. John's, Nfld., Progress Rep. 33: 52 p.

*Lee, R. K. S. 1966. Some fresh-water plants of Newfoundland. Resource Development Service, St. John's, Nfld., Progress Rep. 34: 6 p.

Meadus, H. M. 1966. Exploits River engineering report. Resource Development Service, St. John's, Nfld., Progress Rep. 35: 40 p.

Murphy, H. 1966. A spawning survey report of Harry's River. Resource Development Service, St. John's, Nfld., Progress Rep. 36: 29 p.

Peet, R. F. 1966. Counting fence and counting trap data - 1965. Resource Development Service, St. John's, Nfld. 44 p.

Pippy, J.H.C. 1966. Key to the parasites of the Salmonidae of insular Newfoundland. Resource Development Service, St. John's, Nfld., Progress Rep. 37: 170 p.

Pippy, J.H.C. 1966. A biological and ecological study of the Salmonidae of Victoria Lake. Resource Development Service, St. John's, Nfld., Progress Rep. 38: 104 p.

Riche, L. G. 1966. A preliminary investigation of the White Bear River. Resource Development Service, St. John's, Nfld., Progress Rep. 39: 51 p.

Riche, L. G. 1966. A stream survey report of Black and North Harbour Rivers. Resource Development Service, St. John's, Nfld., Progress Rep. 40: 20 p.

Sturge, C. 1966. The Rattling Brook transfer - 1957-1965. Resource Development Service, St. John's, Nfld., Progress Rep. 41: 39 p.

*Wiseman, R. J., and C. W. Andrews. 1966. Progress report on a comparative study of speckled trout populations (Salvelinus fontinalis) in Newfoundland. Resource Development Service, St. John's, Nfld., Progress Rep. 42: 8 p.

## PUBLICATIONS - 1967

Anon. 1967. [Edited by V. R. Taylor] Report of Resource Development Service (Newfoundland Region) for 1966. Resource Development Service, St. John's, Nfld. 85 p.

Anon. 1967. Counting fence and counting trap data - 1966. Resource Development Service, St. John's, Nfld. 27 p.

Mercer, K. M. 1967. A preliminary biological survey of four Exploits River tributaries. Resource Development Branch, St. John's, Nfld., Progress Rep. 79: 81 p.

*Percy, J. A., and F. A. Aldrich. 1967. Investigations on oysters, Crassostrea virginica (Gmelin), planted at Broad Lake, Bellevue, Trinity Bay, Newfoundland. Resource Development Service, St. John's, Nfld., Progress Rep. 43: 61 p.

*Steele, D. H. 1967. Report on investigations on the fresh-water amphipods of Newfoundland. Resource Development Service, St. John's, Nfld., Progress Rep. 44: 7 p.

## PUBLICATIONS - 1968

*Aldrich, F. A. 1968. Investigations on oysters, Crassostrea virginica (Gmelin), planted in Broad Lake, Bellevue Beach, Trinity Bay. Resource Development Branch, St. John's, Nfld., Progress Rep. 45: 34 p.

Anon. 1968. [Edited by V. R. Taylor] Report of Resource Development Service (Newfoundland Region) for 1967. Resource Development Service, St. John's, Nfld. 63 p.

Anon. 1968. Counting fence and counting trap data - 1967. Resource Development Service, St. John's, Nfld. 41 p.

Downer, D. F. 1968. Preliminary investigations of the Harry's River system. Resource Development Branch, St. John's, Nfld., Progress Rep. 46: 75 p.

Hatfield, C. T. 1968. Effects of DDT larvaciding on aquatic fauna of Bobby's Brook, Labrador. Resource Development Branch, St. John's, Nfld., Progress Rep. 47: 50 p.

Peet, R. F. 1968. A report on a reconnaisance survey and counting fence operation conducted in south-east Labrador during 1966. Resource Development Branch, St. John's, Nfld., Progress Rep. 48: 154 p.

Pond, S. 1968. A report on the Noel Paul's Brook electrofishing census, 1966-1967. Resource Development Branch, St. John's, Nfld., Progress Rep. 49: 31 p.

Pratt, J. D. 1968. Spawning distribution of Atlantic salmon (Salmo salar L.) in controlled flow channels. Resource Development Branch, St. John's, Nfld., Progress Rep. 50: 143 p. [also M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld.].

*Steele, D. H. 1968. Report on investigations on the fresh water amphipods of Newfoundland in 1967. Resource Development Branch, St. John's, Nfld., Progress Rep. 52: 10 p.

Sturge, C. C. 1968. Production studies on the young stages of Atlantic salmon (Salmo salar L.) in an experimental area of Indian River, N.D.B., Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 53: 134 p. [also M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld.].

## PUBLICATIONS - 1969

*Aldrich, F. A., and R. P. Scaplen. 1969. Further investigations on oysters, Crassostrea virginica (Gmelin), planted in Broad Lake, Bellevue Beach, Trinity Bay. Resource Development Branch, St. John's, Nfld., Progress Rep. 54: 45 p.

Anon. 1969. [Edited by V. R. Taylor] Report of Resource Development Service (Newfoundland Region) for 1968. Resource Development Service, St. John's, Nfld. 66 p.

Anon. 1969. Counting fence and counting trap data - 1968. Resource Development Service, St. John's, Nfld. 37 p.

Hatfield, C. T. 1969. Effects of aerial spraying with sumithion and phosphamidon on salmon brooks in western and central Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 59: 57 p.

Hatfield, C. T. 1969. Effects of DDT larviciding on aquatic fauna of Bobby's Brook, Labrador. Can. Fish. Cult. 40: 61-72.

*Liew, P.K.L. 1969. A study on the biology of brown trout, Salmo trutta Linn., from four different habitats on the Avalon Peninsula, Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 55: 186 p.

Murray, A. R., and T. J. Harmon. 1969. A preliminary consideration of the factors affecting the productivity of Newfoundland streams. Resource Development Branch, St. John's, Nfld., Progress Rep. 60: 405 p. [also Fish. Res. Board Can. Tech. Rep. 130].

Riche, L. G. 1969. Long Harbour River investigations - 1966. Resource Development Branch, St. John's, Nfld., Progress Rep. 51: 49 p.

Riche, L. G. 1969. Fishels Brook and the Upper Humber River; a comparative evaluation. Resource Development Branch, St. John's, Nfld., Progress Rep. 56: 20 p.

Riche, L. G., and L. Coady. 1969. Effects of aerial spraying with sumithion on salmon brooks in western and central Newfoundland, 1969, with specific reference to aquatic insects. Resource Development Branch, St. John's, Nfld., Progress Rep. 61: 43 p.

Riche, L. G., and G. R. Traverse. 1969. River investigations 1968 - Avalon Peninsula - an evaluation. Resource Development Branch, St. John's, Nfld., Progress Rep. 57: 93 p.

*Wiseman, R. J. 1969. Some aspects of the biology of the speckled trout, Salvelinus fontinalis (Mitchell) 1815, in the waters of insular Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 58: 204 p. [also M.Sc. thesis, Memorial Univ. Newfoundland, St. John's, Nfld.].

## PUBLICATIONS - 1970

Anon. 1970. [Edited by V. R. Taylor] Report of the Resource Development Branch (Newfoundland Region) for 1969. Resource Development Branch, St. John's, Nfld. 77 p.

Chamut, P. 1970. Exploits River investigations - 1969. Heavy metals in the Exploits River. Resource Development Branch, St. John's, Nfld., Progress Rep. 62: 58 p.

Mascaluk, D. M., and P. S. Chamut. 1970. Preliminary report on the hydrography and pulp and paper mill pollution of the Humber Arm, Bay of Islands, Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 63. 41 p.

Murphy, H. P. 1970. A report of biological operations, Sand Hill River, Labrador, 1969, 1970, and 1971. Resource Development Branch, St. John's. Nfld., Progress Rep. 89. 244 p.

Riche, L. G., and G. R. Traverse. 1970. Fishway counting trap and counting fence data - 1969. Resource Development Branch, St. John's, Nfld. 45 p.

Riche, L. G., and G. R. Traverse. 1970. Fishway counting trap and counting fence data - 1970. Resource Development Branch, St. John's, Nfld. 45 p.

Rietveld, H. J. 1970. Indian River investigations - 1969. Research Development Branch, St. John's, Nfld., Progress Rep. 69: 40 p.

*Scaplen, R. P., and F. A. Aldrich. 1970. The surviving oysters in Broad Lake, Trinity Bay, 1969. Resource Development Branch, St. John's, Nfld., Progress Rep. 66: 33 p.

Villamere, J. A. 1970. The pulp and paper industry: processes and pollution. Resource Development Branch, St. John's, Nfld., Progress Rep. 64: 100 p.

Wiseman, R. J. 1970. The limnology and ecology of Petty Harbour, Long Pond: an unfished reservoir. Resource Development Branch, St. John's, Nfld., Progress Rep. 65: 87 p.

PUBLICATIONS - 1971

Addison, R. F., R. G. Ackman, L. J. Cowley, D. Mascaluk, and S. Pond. 1971. Elemental phosphorous levels in water samples from Long Harbour, Nfld. (July, 1969-June, 1970). Fish. Res. Board Can. Tech. Rep. 254: 29 p.

Anon. 1971. [Edited by V. R. Taylor] Report of the Resource Development Branch (Newfoundland Region) for 1970. Resource Development Branch, St. John's, Nfld. 66 p.

Farwell, M. 1971. A descriptive report on the commercial fishery and its relation to the Exploits River fish population. Resource Development Branch, St. John's, Nfld., Progress Rep. 80: 6 p.

Harmon, T. J., and L. G. Riche. 1971. A report on some of the ecological features of Long Harbour River, Fortune Bay. Resource Development Branch, St. John's, Nfld., Progress Rep. 71: 99 p.

*Lee, S. H. 1971. Fecundity of four species of salmonid fishes in Newfoundland waters. Resource Development Branch, St. John's, Nfld., Progress Rep. 76: 114 p.

Murphy, H. P. 1971. A helicopter reconnaissance survey of Eagle, Paradise, and White Bear Rivers, Sandwich Bay, Labrador - August, 1970. Resource Development Branch, St. John's, Nfld., Progress Rep. 83: 53 p.

Peet, R. F. 1971. A report on the counting trap and reconnaissance surveys conducted in central coastal Labrador during 1967. Resource Development Branch, St. John's, Nfld., Progress Rep. 68: 286 p.

Pond, S. G. 1971. A review of the Indian River project, 1963-1968. Resource Development Branch, St. John's, Nfld., Progress Rep. 70: 56 p.

Powell, K. W., and B. J. Flynn. 1971. Stream surveys, 1970, Avalon Peninsula and west coast - cost analysis. Resource Development Branch, St. John's, Nfld., Progress Rep. 78: 48 p.

Riche, L. G., and G. R. Traverse. 1971. River investigations, 1969-1970, east and west coast - an inventory. Resource Development Branch, St. John's, Nfld., Progress Rep. 72: 132 p.

Traverse, G. R. 1971. A stream report, Torrent River, 1971. Resource Development Branch, St. John's, Nfld., Progress Rep. 74: 20 p.

Wiseman, R. J. 1971. The limnology, ecology and sport fishery of Thomas Pond: a multi-use reservoir. Resource Development Branch, St. John's, Nfld., Progress Rep. 73: 133 p.

Wiseman, R. J. 1971. A compendium of field data collected at Thomas Pond 1968-1971. Resource Development Branch, St. John's, Nfld., Progress Rep. 77: 50 p.

## PUBLICATIONS - 1972


Addison, R. F., M. E. Zinck, R. G. Ackman, P. Chamut, and A. Jamieson. 1972. Results of the elemental phosphorous monitoring program, Long Harbour, Newfoundland (July, 1970-April, 1971). Fish. Res. Board Can. Tech. Rep. 303: 25 p.

Anon. 1972. [Edited by V. R. Taylor] Annual Report 1971. Resource Development Branch, St. John's, Nfld. 122 p.

Chamut, P. S., S. G. Pond, and V. R. Taylor. 1972. The "red herring" pollution crisis in Placentia Bay, Newfoundland. A general description and chronology. Fish. Res. Board Can. ARO (Atl. Reg. Off.) Circ. 2: 29-43.

Farwell, M. K. 1972. The downstream migrant fish problems associated with hydroelectric facilities on the Exploits River Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 86: 56 p.

Farwell, M. K. 1972. A report on the 1970 and 1971 smolt runs at Noel Pauls Brook. Resource Development Branch, St. John's, Nfld., Progress Rep. 102: 17 p.

LeDrew, B. R. 1972. Standing crop estimates and stream survey of the Upper Naskaupi River, 1971. Resource Development Branch, St. John's, Nfld., Progress Rep. 85: 88 p.

Murphy, H. P. 1972. A helicopter reconnaissance survey of 21 rivers in southern Labrador, August-September, 1971. Resource Development Branch, St. John's, Nfld., Progress Rep. 95: 164 p.

Peet, R. F., and J. D. Pratt. 1972. Distant and local exploitation of a Labrador Atlantic salmon population by commercial fisheries. [also ICNAF Res. Doc. 72/82, Ser. No. 2809] ICNAF Redb. 1972(III): 65-72.

Riche, L. G. 1972. An outline of methods used in stream surveys and estimation of salmon production with a suggested value for Atlantic salmon sports fish in Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 81: 23 p.

Riche, L. G., and G. R. Traverse. 1972. River investigations, 1971, Burin Peninsula. Resource Development Branch, St. John's, Nfld., Progress Rep. 90: 111 p.

Samant, H. S. 1972. The determination of copper by atomic absorption in presence of added anions and cations. Resource Development Branch, St. John's, Nfld., Progress Rep. 96: 14 p.

Sandeman, E. J., and R. E. Cutting. 1972. Aquaculture - Newfoundland Regional position - biological considerations. Monograph 208888 - Fisheries Service Aquaculture Workshop, Background Documents, Hull, Quebec, August 15-17, 1972. 16 p.

Taylor, V. R., and B. R. Bauld. 1972. A program for increased Atlantic salmon (Salmo salar) production on a major Newfoundland river. Resource Development Branch, St. John's, Nfld., Progress Rep. 87: 21 p.

Traverse, G. R. 1972. Fishway counting trap and counting fence data - 1971. Resource Development Branch, St. John's, Nfld. 65 p.

Traverse, G. R. 1972. Gander River - a stream inventory. Resource Development Branch, St. John's, Nfld., Progress Rep. 93: 41 p.

Whalen, C. A. 1972. The biologic, economic, and legal aspects of pollution and associated problems from a marine thermal generating station. Resource Development Branch, St. John's, Nfld., Progress Rep. 97: 55 p.

Wilson, R.C.H. 1972. The ecological impact of the pulp and paper industry in Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 92: 49 p. [also EPS Manuscript Report No. 72-101.

Wilson, R.C.H., and D. H. Snow. 1972. Non-target effects of abate, an organophosphorus insecticide (Report of a field program to evaluate blackfly control methods at Baie Verte, Newfoundland). Resource Development Branch, St. John's, Nfld., Progress Rep. 88: 177 p.

Wiseman, R. J. 1972. The limnology, ecology and sport fishery of Paddy's Pond: a heavily fished lake near metropolitan St. John's, Newfoundland. Resource Development Branch, St. John's, Nfld., Progress Rep. 84: 163 p.

Wiseman, R. J. 1972. A compendium of field data collected at Paddy's Pond, 1969-1972. Resource Development Branch, St. John's, Nfld., Progress Rep. 91: 62 p.

Wong, H. F. 1972. Report on fish kill in Rennie's River, St. John's, March 9-April 7, 1971. Resource Development Branch, St. John's, Nfld., Progress Rep. 94: 12 p.

## PUBLICATIONS - 1973

Anon. 1973. [Edited by V. R. Taylor] Annual Report - 1972. Resource Development Branch, St. John's, Nfld. 83 p.

Murphy, H. P. 1973. A helicopter reconnaissance survey of 17 Labrador rivers, August 1972. Resource Development Branch, St. John's, Nfld., Progress Rep. 101: 177 p.

Pratt, J. D., and H. J. Rietveld. 1973. Atlantic salmon development techniques used in Newfoundland. Resource Development Branch, St. John's, Nfld., Technical Rep. Series No. NEW/T-73-1: 19 p.

Riche, L. G. 1973. West coast river development - a brief outline, 1972. Resource Development Branch, St. John's, Nfld., Progress Rep. 99: 29 p.

Taylor, V. R. 1973. Egg to fry survival rates for Atlantic salmon using different incubation techniques and their implications for brood stock requirements in salmon development and enhancement programs. Resource Development Branch, St. John's, Nfld., Progress Rep. 98: 16 p.

Taylor, V. R. 1973. General description of a proposed multi-purpose fish culture establishment (Nfld.) (Revised). Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-73-1: 56 p.

Taylor, V. R., and B. R. Bauld. 1973. A program for increased Atlantic salmon (Salmo salar) production in a major Newfoundland river. Int. Atl. Salmon Symp., Spec. Publ. Ser. 4(1): 339-347.

Traverse, G. R. 1973. Fishway counting trap and counting fence data - 1972. Resource Development Branch, St. John's, Nfld. 66 p.

Wiseman, R. J. 1973. The limnology and sport fish populations of selected Avalon Peninsula lakes. Resource Development Branch, St. John's, Nfld., Progress Rep. 100: 172 p.

Wiseman, R. J. 1973. Monthly surface temperatures of selected Avalon Peninsula lakes. Resource Development Branch, St. John's, Nfld., Progress Rep. 103: 11 p.

## PUBLICATIONS - 1974

Anon. 1974. [Edited by V. R. Taylor] Annual Report - 1973. Resource Development Branch, Annual Report No. NEW/A-73: 41 p.

Anon. 1974. Format for Resource Development publications. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-9: 31 p.

Bruce, W. J. 1974. The limnology and fish populations of Jacopie Lake, West Forebay, Smallwood Reservoir, Labrador. Resource Development Branch, St. John's, Nfld., Technical Rep. Series No. NEW/T-74-2: 74 p.

Button, C. E., and T. J. Wells. 1974. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1973. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-10: 56 p.

Coady, L. 1974. The Arctic char fishery of northern Labrador. Resource Development Branch, St. John's, Nfld., Progress Rep. 104: 31 p.

Hare, G. M., and H. P. Murphy. 1974. First record of the American shad (Alosa sapidissima) from Labrador water. J. Fish. Res. Board Can. 31: 1536-1537.

Jamieson, A. 1974. Results of water analysis on selected streams and lakes of Newfoundland and Labrador (1972-73). Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-3: 32 p.

Jamieson, A. 1974. A water quality atlas for streams and lakes of insular Newfoundland. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-4: 22 p.

Mercer, K. M. 1974. Resource potential of the Exploits River for Atlantic salmon. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-3: 20 p.

Mercer, K. M., and T. C. Anderson. 1974. Summary of the 1973 Exploits River field activities. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-4: 53 p.

Murphy, H. P. 1974. A report of biological operations, Sandhill River, Labrador, 1972 and 1973. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-6: 125 p.

Murphy, H. P., and T. R. Porter. 1974. Stream surveys of 31 rivers in Labrador. Vol. I: English River to Fraser River; Vol. II: Kamanatsuk Brook to Eclipse River. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-8: 286 p.

Porter, T. R., and J. P. Davis. 1974. Fishway and counting fence data - 1973. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-6: 53 p.

Porter, T. R., R. B. Moores, and G. R. Traverse. 1974. River investigations on the southwest coast of insular Newfoundland. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-2: 161 p.

Porter, T. R., L. G. Riche, and G. R. Traverse. 1974. Catalogue of rivers in insular Nfld. Vols. A-D. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-9: 1321 p.

Pratt, J. D., M. K. Farwell, and H. J. Rietveld. 1974. Atlantic salmon production using a spawning channel. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-7: 29 p.

Pratt, J. D., G. M. Hare, and H. P. Murphy. 1974. The production and harvest of an Atlantic salmon population, Sandhill River, Labrador. Resource Development Branch, St. John's, Nfld., Technical Rep. Series No. NEW/T-74-1: 27 p.

Rowe, L. W. 1974. Habitat protection: recommended guidelines for construction and forestry. Resource Development Branch, St. John's, Nfld., Information Rep. Series No. NEW/N-74-1: 34 p.

Waldron, D. E. 1974. 1973 Newfoundland and Labrador Atlantic salmon commercial catch data. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-1: 127 p.

Waldron, D. E. 1974. Codes used in the Newfoundland commercial and recreational fisheries. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-2: 128 p.

Waldron, D. E. 1974. 1974 Newfoundland commercial Atlantic salmon fishery. I. Preliminary results for May and June. Resource Development Branch, St. John's, Nfld., Data Record Series. No. NEW/D-74-8: 67 p.

Whelan, C. A. and A. Jamieson. 1974. The fishing industry in seven Nfld. bays. Report to the Fisheries and Marine Service Study Group on Deep Water Ports. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-74-5: 70 p.

Wiseman, R. J., and W. G. Whelan. 1974. The limnology and sport fish populations of 10 Avalon Peninsula lakes. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-74-7: 122 p.

## PUBLICATIONS - 1975

Anon. 1975. [Edited by V. R. Taylor] Annual Report - 1974. Resource Development Branch, Annual Report No. NEW/A-74: 48 p.

Bruce, W. J. 1975. Experimental gillnet fishing at Lobstick and Sandgirt Lakes, Smallwood Reservoir, western Labrador, 1974. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-75-4: 35 p.

Bruce, W. J. 1975. Some aspects of the biology of landlocked smelt, Osmerus eperlanus mordax (Mitchill) 1815, in selected Avalon Peninsula lakes. Resource Development Branch, St. John's, Nfld., Technical Rep. Series No. NEW/T-75-2: 107 p.

Bruce, W. J., C. J. Morry, L. W. Rowe, and R. J. Wiseman. 1975. An overview of fisheries problems associated with the proposed lower Churchill hydroelectric development, Gull Island, Labrador. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-75-2: 54 p.

Button, C. E., and T. J. Wells. 1975. Atlantic salmon angled catch and effort data, Newfoundland and Labrador, 1974. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-75-4: 57 p.

Davis, J. P., and M. K. Farwell. 1975. Exploits River and Indian River Atlantic salmon development programs 1974. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-75-1: 55 p.

Farwell, M. 1975. The development of the Exploits River Atlantic salmon. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-75-3: 50 p.

Jamieson, A. 1975. Fluoride levels in the freshwaters of the Long Harbour area of Placentia Bay - 1974. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-75-3: 21 p.

Jamieson, A., and B. D. Brown. 1975. Ten years of water analysis results on the Exploits River system (1965-1973). Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-75-2: 263 p.

Parsons, R. F. 1975. The limnology and fish biology of Ten Mile Lake, Labrador. Resource Development Branch, St. John's, Nfld., Technical Rep. Series No. NEW/T-75-3: 75 p.

Pepper, V., B. Moores, and J. Davis. 1975. Fishway and counting fence data - 1974. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW-D-75-1: 44 p.

Porter, T. R. 1975. Biology of Atlantic salmon in Newfoundland and Labrador. Resource Development Branch, St. John's, Nfld., Information Rep. Series No. NEW/N-75-2: 11 p.

Rowe, L. W. 1975. Fish habitat protection guidelines for loggers. Resource Development Branch, St. John's, Nfld., Information Rep. Series No. NEW/N-75-1: 15 p.

Taylor, V. R. 1975. A preliminary assessment of Newfoundland near-shore areas as potential sites for salmonid mariculture. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-75-5: 87 p.

Whelan, W. G., and R. J. Wiseman. 1975. An ocular estimate of potential freshwater habitat for resident sport fish in insular Newfoundland. Resource Development Branch, St. John's, Nfld., Internal Rep. Series No. NEW/I-75-6: 38 p.

Whelan, W. G., and R. J. Wiseman. 1975. The limnology and sport fish populations of three lakes located in the Deer Park, Avalon Peninsula, Newfoundland. Resource Development Branch, St. John's, Nfld., Data Record Series No. NEW/D-75-5: 49 p.

## Appendix 4. Scientific staff, 1931-84.

Legend

[1] approximate date
[2] with Resource Development Branch prior to Jan. 1, 1976
[3] with Technological Unit prior to April 1, 1971
[4] formerly on full-time technical staff
[5] post-doctorate fellowship

| | | | | |
|---|---|---|---|---|
| Akenhead, S. A. | (Scott) | | November 1, 1976 | - present |
| Anderson, J. T.[4] | (John) | | March 13, 1979 | - present |
| Anderson, T. C. | (Tim) | | August 15, 1983 | - present |
| Andrews, G. L. | (Gertrude) | | November 1, 1950 | - April 30, 1955 |
| Atkinson, D. B.[4] | (Bruce) | | August 22, 1978 | - present |
| Bain, L. H. | (Hugh) | | September 4, 1979 | - present |
| Baird, J. S.[4] | (Jim) | | February 9, 1981 | - present |
| Banoub, J. H. | (Joe) | | October, 4, 1979 | - present |
| Barnes, M. A.[4] | (Marvin) | | November 8, 1982 | - present |
| Bauld, C. | (Cathy) | | November 29, 1982 | - July 27, 1984 |
| Bishop, C. A.[4,5] | (Claude) | | June 1, 1973 | - present |
| Black, G. A.[5] | (Geoff) | | April 15, 1984 | - present |
| Black, W. R. | (Bob) | | June 30, 1972 | - 1975[1] |
| Blair, A. A. | (Art) | | 1939 | - March 6, 1970 |
| Botta, J. R. | (Rick) | | January 2, 1974 | - October 1, 1976 |
| Bourgeois, C. E. | (Chuck) | | May 30, 1983 | - present |
| Bowen, W. D. | (Don) | | September 11, 1978 | - June 30, 1984 |
| Bowering, W. R.[4] | (Ray) | | June 1, 1973 | - present |
| Brodie, W. B.[4] | (Bill) | | March 17, 1980 | - present |
| Bruce, W. J. | (Willie) | | January 1, 1976[2] | - July 11, 1983 |
| Button, C. E. | (Clar) | | January 1, 1976[2] | - September 19, 1977 |
| Campbell, J. S. | (Scott) | | January 22, 1973 | - April 1974 |
| Carscadden, J. E. | (Jim) | | April 1, 1975 | - present |
| Chadwick, E.M.P. | (Mike) | | August 23, 1976 | - September 7, 1982 |
| Chilvers, R. M. | (Roy) | | August 17, 1956 | - August 27, 1958 |
| Clements, C. J. | (Carol) | | May 11, 1981 | - September, 1982 |
| Coady, L. W. | (Larry) | | January 1, 1976[2] | - March 31, 1976 |
| | | and | February 25, 1980 | - present |
| Cone, D. K.[5] | (Dave) | | May 21, 1980 | - February, 1982 |
| Cross, T.[5] | (Tom) | | April 9, 1975 | - March 31, 1977 |
| Dalley, E. L. | (Edgar) | | June 8, 1978 | - present |
| Dawe, E. G. | (Earl) | | December 13, 1979 | - present |
| Dempson, J. B. | (Brian) | | July 26, 1976 | - present |
| Dey, A. C. | (Arun) | | April 1, 1980 | - present |
| Easton, M. | (Mike) | | September, 1975 | - May 1, 1982 |
| Ellis, R. W.[4] | (Ron) | | August 27, 1953 | - March 4, 1955 |
| Ennis, G. P.[4] | (Gerry) | | July 1, 1968 | - present |
| Evans, G. T. | (Geoff) | | March 9, 1982 | - present |
| Fairbairn, D.[4] | (Daphne) | | August 1, 1978 | - August 14, 1980 |
| Fancey, L. L.[4] | (Linda) | | October 1, 1978 | - January 21, 1979 |
| | | and | October 9, 1979 | - September 7, 1980 |
| | | and | February 1, 1981 | - January 5, 1982 |
| | | and | October 22, 1984 | - present |
| Farwell, M. K.[4] | (Morley) | | January 1, 1976[2] | - March 1976[1] |
| Fleming, A. M.[4] | (Allister) | | 1947 | - August 31, 1964 |
| | | and | September 1, 1965 | - December, 1977 |
| Frost, N. | (Nancy) | | 1931 | - 1942[1] |
| Gare, R. L. | (Ron) | | October 2, 1972 | - March, 1975[1] |
| Garman, G. C.[5] | (Greg) | | July 23, 1984 | - present |
| Gavaris, C. A. | (Carol) | | January 2, 1979 | - July 3, 1982 |
| Gavaris, S. | (Stratis) | | January 2, 1979 | - June 2, 1984 |
| Gibson, R. J. | (John) | | January 2, 1980 | - present |
| Giles, M. A.[5] | (Mike) | | May 31, 1973 | - March, 1975[1] |
| Goff, G. P.[5] | (Greg) | | September 14, 1984 | - present |
| Hampton, W. F. | (Bill) | | 1935[1] | - 1943[1] |
| Handrigan, G. L. | (Les) | | 1947[1] | - 1951[1] |
| Hay, K. A. | (Keith) | | November 1, 1978 | - present |
| Hennessey, J. P.[4] | (John) | | 1947[1] | - May 31, 1951 |
| Hodder, V. M.[4] | (Vince) | | July 1, 1956 | - August 31, 1966 |
| | | and | July 1, 1968 | - September 14, 1971 |
| Hourston, A. S. | (Al) | | September 1, 1966 | - June 30, 1968 |
| Hunt, R. P. | (Bob) | | 1951 | - May 11, 1954 |
| Hunter, R. | (Robin) | | April 10, 1978 | - March 2, 1979 |
| Hurley, G. | (Geoff) | | August 28, 1978 | - December 1, 1979[1] |
| Johnson, B.G.H. | (Herb) | | June 15, 1951 | - May 8, 1956 |
| Johnston, A. B. | (Allan) | | 1935[1] | - 1945[1] |
| Kane, K. M. | (Kevin) | | April 1, 1971[3] | - March 3, 1972 |

| | | | | |
|---|---|---|---|---|
| Keir, R. S. | (Ron) | | June 12, 1951 | - October 27, 1954 |
| Kendaris, T. | (Ted) | | June 25, 1980 | - April 24, 1981 |
| Kennedy, V. S.[5] | (Vic) | | September 20, 1974 | - April 27, 1976 |
| Kicenluk, J. W. | (Joe) | | September 2, 1975 | - present |
| Knapp-Fisher, R. C.[5] | (Robin) | | July 14, 1951 | - July 28, 1954 |
| Kruse, G. H. | (Gord) | | January 15, 1984 | - present |
| Kulka, D. W. | (Dave) | | October 3, 1977 | - present |
| Lambert, D. G. | (Sim) | | July 13, 1953 | - February 2, 1955 |
| Lauder, J. | (Jack) | | April 1, 1971[3] | - October 1, 1976 |
| Lear, W. H.[4] | (Henry) | | May 15, 1967 | - present |
| Lee, Y. Z.[5] | (Yung) | | November 3, 1975 | - October 31, 1977 |
| Lilly, G. R. | (George) | | June 19, 1978 | - present |
| Lindsay, S. T. | (Sheila) | | 1931 | - fall, 1936 |
| Lobel, P.[5] | (Paul) | | November, 1982 | - March 31, 1984 |
| MacCallum, W. A. | (Wally) | | April 1, 1971[3] | - August 28, 1972 |
| MacPherson, H. D. | (Hector) | | August 13, 1952 | - September 24, 1955 |
| MacPherson, N. L. | (Norman) | | 1931 | - 1937[4] |
| Marshall, G. | (Geoff) | | February 1, 1982 | - present |
| May, A. W. | (Art) | | May 13, 1958 | - June 30, 1972 |
| | | and | August 7, 1973 | - August 14, 1974 |
| McCubbin, R. N.[4] | (Rick) | | October 15, 1984 | - present |
| McKone, W. D. | (Doug) | | February 1, 1975 | - May, 1981 |
| Meerburg, D. | (Dave) | | September 20, 1976 | - June 14, 1979 |
| Mercer, M. C. | (Mac) | | August 2, 1965 | - May 1, 1976 |
| | | and | August 31, 1981 | - present |
| Michon, F.[5] | (Francis) | | October 28, 1980 | - January, 1983 |
| Miller, D. S. | (Dan) | | July 1977 | - present |
| Miller, R. J. | (Bob) | | April 28, 1971 | - May 31, 1979 |
| Misra, R. K. | (Raj) | | May 23, 1975 | - August 31, 1982 |
| Moores, J. A. | (John) | | May 9, 1972 | - May 9, 1983 |
| Morry, C. J. | (Chris) | | January 1, 1976[2] | - September 5, 1977 |
| Murray, A. R. | (Al) | | July 7, 1953 | - July 18, 1969 |
| Myers, R. A. | (Ransom) | | May 18, 1983 | - present |
| Naidu, K. S. | (Sam) | | January 10, 1975 | - present |
| Nakashima, B. S. | (Brian) | | January 14, 1980 | - present |
| Ni, I-H. | (I-Hsun) | | February 1, 1978 | - present |
| Nyman, O. L. | (Lennart) | | September 27, 1968 | - September 22, 1970 |
| O'Connell, M. F. | (Mike) | | June 9, 1980 | - present |
| Olsen, S. J. | (Steiner) | | November 23, 1956 | - July 13, 1960 |
| Parsons, D. G. | (Don) | | August 28, 1972 | - present |
| Parsons, L. S. | (Scott) | | May 21, 1968 | - April 15, 1976 |
| Pauls, C. J. | (Cyril) | | May 1, 1969 | - September 14, 1970 |
| Payne, J. F. | (Jerry) | | April 30, 1973 | - present |
| Payne, R. H. | (Ron) | | August 26, 1971 | - June 30, 1977 |
| Penrose, W. R. | (Bill) | | June 27, 1972 | - February 2, 1980 |
| Pepper, V. A. | (Vern) | | January 1, 1976[2] | - present |
| Pinhorn, A.T.C.[4] | (Al) | | May 16, 1960 | - present |
| Pippy, J.H.C. | (John) | | January 16, 1969 | - present |
| Pitt, T. K. | (Tom) | | July 1, 1950 | - present |
| Porter, T. R.[2] | (Rex) | | January 1, 1976[2] | - present |
| Pratt, J. D. | (Jerry) | | July 7, 1980 | - present |
| Prouse, M. E. | (Marjorie) | | July 1, 1956 | - September 19, 1958 |
| Radtke, R. L.[5] | (Richard) | | December 15, 1978 | - December 14, 1980 |
| Reddin, D. G. | (Dave) | | July 19, 1976 | - present |
| Rees, E.I.S. | (Ivor) | | 1959 | - March 15, 1963 |
| Rice, J. C. | (Jake) | | June 21, 1982 | - present |
| Roff, D. | (Derek) | | June 1, 1978 | - August 14, 1980 |
| Ryan, P. M. | (Pat) | | June 19, 1978 | - present |
| Sandeman, E. J. | (Sandy) | | July 24, 1953 | - September 15, 1975 |
| | | and | February 19, 1976 | - present |
| Scruton, D. A. | (Dave) | | August 12, 1981 | - present |
| Sergeant, D. E. | (Dave) | | October 2, 1951 | - October 1, 1955 |
| Shaw, D. H. | (Derek) | | April 1, 1971[3] | - present |
| Skirving, P. D.[4] | (Paul) | | March 1, 1982 | - June 12, 1982 |
| Smith, S. | (Steve) | | January 8, 1979 | - November 27, 1980 |
| Somerton, G. D. | (Gary) | | July 10, 1979 | - present |
| Squires, H. J. | (Hubert) | | May 13, 1950 | - May 30, 1968 |
| Stansbury, D. E. | (Don) | | February 1, 1980 | - present |

| | | | |
|---|---|---|---|
| Stevenson, S. C.[4] | (Spencer) | July 4, 1977 | - present |
| Stewart, T. N. | (Tom) | July 19, 1952[3] | - September 7, 1955 |
| Striha, R. | (Bob) | April 1, 1971[3] | - April 4, 1975 |
| Taylor, D. M.[4] | (Dave) | September 20, 1978 | - present |
| Templeman, W. J. | (Wilfred) | 1938 | - March, 1972 |
| Thompson, H. | (Harold) | July 5, 1930 | - fall, 1936 |
| Tibbo, S. N. | (Noel) | 1940 | - 1950 |
| Traylen, A. D.[4] | (Alfred) | July 22, 1953 | - July 20, 1954 |
| Tucker, R. J.[4] | (Reg) | January 1, 1976 | - present |
| Verspoor, E.[5] | (Eric) | November 15, 1984 | - present |
| Waldron, D.[4] | (Don) | January 1, 1976[2] | - July 17, 1977 |
| Walsh, S. J.[4] | (Steve) | March 12, 1979 | - present |
| Wells, R. | (Dick) | May 14, 1962 | - present |
| Wheeler, J. P. | (John) | October 15, 1979 | - present |
| Whiteley, G. C. | (George) | 1931 | - 1935[1] |
| Wiggins, W.G.B. | (Glen) | June 13, 1950 | - September 11, 1951 |
| Wiles, M. | (Mike) | October 8, 1965 | - July 31, 1967 |
| Williamson, G. R. | (Gordon) | December 15, 1960 | - July 3, 1963 |
| Wilson, A. M. | (Anna) | 1931 | - 1944[1] |
| Winters, G. H. | (George) | May 2, 1966 | - present |
| Wiseman, R. J. | (Bob) | January 1, 1976[2] | - present |

Appendix 5. Organizational units (scientific), 1949-84.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1949 | Groundfish | Salmon | Hydrography and Fish Oils | Herring | | | |
| 1950 | Groundfish | Salmon | Hydrography and Fish Chemistry | Herring | | | |
| 1951 | Groundfish | Salmon | Hydrography and Fish Oils | Whales | | | |
| 1952 | Groundfish | Salmon | Hydrography | Marine Mammals | Fish Chemistry | | |
| 1953 | Groundfish | Salmon | Hydrography | Marine Mammals | Fish Chemistry | Arctic Char | |
| 1954 | Groundfish Biology | Groundfish Population Studies | Longlining | Danish Seining and Witch Flounder | Redfish Life History | Savings Gear and American plaice | Atlantic Salmon River Population Surveys |
| | Atlantic Salmon River Population Study | Marine Mammals | Arctic Char | Hydrography | | | |
| 1955 | Groundfish Research Vessel Operation and Exploratory Fishing | Groundfish Population Studies and Cod | Pleuronectids | Redfish | Plankton and Groundfish Food | Hydrography | Marine Mammals |
| | Salmon | | | | | | |
| 1956 | Groundfish Research Vessel Operation and Exploratory Fishing | Groundfish Population Studies and Studies | Groundfish Mathematical Statistics | Groundfish Biology and Haddock | Pleuronectids | Redfish | Plankton and Groundfish Food |
| | Salmon Research | Hydrography | | | | | |
| 1957 | Groundfish Population Studies and Cod | Groundfish Mathematical Statistics | Groundfish Biology and Haddock | Pleuronectids | Redfish | Plankton and Groundfish Food | Pelagic Fishes |
| | Hydrography | Salmon Research | Salmon Research-Little Codroy Project | | | | |
| 1958 | Groundfish Population Studies and Inshore Cod | Groundfish Mathematical Statistics | Groundfish Biology and Haddock | Pleuronectids | Redfish | Plankton and Groundfish Food | Pelagic Fishes |
| | Hydrography | Salmon Research | Salmon Research-Little Codroy Project | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1959 | Groundfish Population Studies and Inshore Cod | Groundfish Mathematical Statistics | Groundfish Biology and Haddock | Pleuronectids | Redfish | Plankton and Invertebrates | Hydrography |
| | Salmon Research | Salmon Research -Little Codroy Project | Labrador Cod | | | | |
| 1960 | Newfoundland Inshore Cod, Groundfish Sampling and Statistics | Labrador and Offshore Cod | Haddock and Mathematical Statistics | Redfish | Pleuronectids | Groundfish Biology and Distribution | Invertebrates |
| | Hydrography | Salmon Research | Salmon Research -Little Codroy Project | | | | |
| 1961 | Newfoundland Inshore Cod, Groundfish Sampling and Statistics | Labrador and Offshore Cod | Haddock and Mathematical Statistics | Redfish | Pleuronectids | Groundfish Biology and Distribution | Invertebrates |
| | Hydrography | Salmon Research -North Harbour River | Salmon Research -Little Codroy Project | | | | |
| 1962 | Newfoundland Inshore Cod, Groundfish Sampling and Statistics | Labrador and Offshore Cod | Haddock and Mathematical Statistics | Redfish | Pleuronectids | Groundfish Biology and Distribution | Invertebrates |
| | Hydrography | Salmon Research -North Harbour River | Salmon Research -Little Codroy Project | | | | |
| 1963 | Newfoundland Inshore Cod, Groundfish Sampling and Statistics | Labrador Northern Nfld and Offshore Cod | Haddock and Mathematical Statistics | Redfish | Pleuronectids | Groundfish Biology and Distribution | Invertebrates |
| | Hydrography | Salmon Research -North Harbour River | Salmon Research -Little Codroy Project | | | | |
| 1964 | Newfoundland Inshore Cod, Groundfish Sampling and Statistics | Labrador, Northern Nfld and Offshore Cod | Haddock and Mathematical Statistics | Redfish | Pleuronectids | Groundfish Biology and Distribution | Commercial Invertebrates |
| | Salmon | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1965 | Labrador, NE Nfld and Gulf Cod | Newfoundland Cod South and East, Groundfish Statistics and Sampling | Haddock, Cod South Grand Bank and Flemish Cap | Redfish | Pleuronectids | Groundfish Biology and Distribution | Pelagic Fishes |
| | Salmon | Commercial Invertebrates | | | | | |
| 1966 | Labrador, NE Nfld and Gulf Cod | Newfoundland Cod South and East, Groundfish Statistics and Sampling | Haddock, Cod South Grand Bank and Flemish Cap | Redfish | Pleuronectids | Groundfish Biology and Distribution | Pelagic Fishes |
| | Salmon | Commercial Invertebrates | | | | | |
| 1967 | Labrador NE Nfld and Gulf Cod | Newfoundland Cod South and East, Groundfish Statistics and Sampling | Haddock, Cod South Grand Bank and Flemish Cap | Redfish | Pleuronectids | Fish Systematics, Distribution | Pelagic Fishes |
| | Salmon | Commercial Invertebrates | | | | | |
| 1968 | Fish Distribution and Systematics | Cod, Northern and Gulf | Cod, Eastern; Groundfish Sampling and Statistics | Haddock and Cod, Southern | Redfish | Pleuronectids | Pelagic Fish |
| | Anadromous Fish | Commercial Invertebrates | | | | | |
| 1969 | Fish Distribution and Systematics | Cod, Northern and Gulf | Cod, Eastern; Groundfish Sampling and Statistics | Haddock and Cod, Southern | Redfish | Pleuronectids | Pelagic Fish |
| | Anadromous Fish | Commercial Invertebrates | | | | | |
| 1970 | Fish Distribution and Systematics | Cod, Northern and Gulf | Cod, Eastern; Groundfish Sampling and Statistics | Haddock and Cod, Southern | Pleuronectids | Pelagic Fish | Anadromous Fish |
| | Commercial Invertebrates | | | | | | |
| 1971 | Fish Distribution and Systematics | Cod, Northern and Gulf | Cod, Eastern; Groundfish Sampling and Statistics | Haddock and Cod, Southern | Pleuronectids | Pelagic Fish | Anadromous Fish |
| | Commercial Invertebrates | Technology Division | | | | | |
| 1972 | Groundfish | Pelagic Fish | Anadromous Fish | Commercial Invertebrates | Environmental Quality | Oceanography | Technology |
| 1973 | Groundfish | Pelagic Fish | Anadromous Fish | Commercial Invertebrates | Environmental Quality | Oceanography | Technology |

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| 1974 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic, Salmon, Shellfish | Experimental Ecology | Marine Products | |
| 1975 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic and Shellfish | Freshwater and Anadromous Fisheries Management | Experimental Ecology | Marine Products |
| 1976 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic and Shellfish | Freshwater and Anadromous Fisheries Management | Experimental Ecology | Microbial Chemistry |
| 1977 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic and Shellfish | Freshwater and Anadromous Fisheries Management | Experimental Ecology | |
| 1978 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic Shellfish, Marine Mammals | Freshwater and Anadromous Fisheries Management | Experimental Ecology | |
| 1979 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic Shellfish, Marine Mammals | Freshwater and Anadromous Fisheries Management | Experimental Ecology | |
| 1980 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic Shellfish, Marine Mammals | Freshwater and Anadromous Fisheries Management | Experimental Ecology | |
| 1981 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic Shellfish, Marine Mammals | Freshwater and Anadromous Fisheries Management | Experimental Ecology | |
| 1982 | Marine Fisheries Management -Groundfish | Marine Fisheries Management -Pelagic Shellfish, Marine Mammals | Freshwater and Anadromous Fish | Experimental Ecology | |

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| 1983 | Groundfish | Pelagic Fish, Shellfish and Marine Mammals | Freshwater and Anadromous Fish | Experimental Ecology |
| 1984 | Groundfish | Pelagic Fish, Shellfish and Marine Mammals | Freshwater and Anadromous Fish | Experimental Ecology |